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MAR 22 1943

U. S. DEPARTMENT OF COMMERCE
JESSE H. JONES, Secretary
NATIONAL BUREAU OF STANDARDS
LYMAN J. BRIGGS, Director

SCREW THREADS AND TAP-DRILL SIZES

COMMERCIAL STANDARD CS24–43

(Revision and consolidation of CS24–30 and CS25–30)

Effective Date for New Production from February 10, 1943

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OF THE TRADE

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PROMULGATION

of

COMMERCIAL STANDARD CS24–43

for

SCREW THREADS AND TAP-DRILL SIZES

(Revision and consolidation of CS24–30 and CS25–30)

At the request of the National Screw Thread Commission, American National screw-thread tables for shop use were circulated January 23, 1930, as recommended commercial standards to producers, distributors, and users for a written acceptance. They were subsequently accepted in writing by the industry and published under the titles, American National Standard Screw Threads, Coarse and Fine-Thread Series, Commercial Standard CS24–30; and American National Special Screw Threads, Commercial Standard CS25–30.

On July 28, 1942, on the recommendation of the Interdepartmental Screw Thread Committee, and with the endorsement of the standing committee, a consolidation and revision of CS24–30 and CS25–30, under the title of Recommended Commercial Standard for Screw Threads and Tap-Drill Sizes, was circulated for acceptance. Those concerned have since accepted and approved the standard as shown herein for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from February 10, 1943.

Promulgation recommended.

I. J. Fairchild,
Chief, Division of Trade Standards.

Promulgated.

Lyman J. Briggs,
Director, National Bureau of Standards.

Promulgation approved.

Jesse H. Jones,
Secretary of Commerce.

ERRATA SHEET
SCREW THREADS AND TAP-DRILL SIZES

COMMERCIAL STANDARD CS24-43

PAGE	LINE	NOW READS	SHOULD READ
21	8 OF LAST COLUMN	.3086	.4086
23	8 OF COLUMN 3	5.305	.5305
26	20 OF COLUMN 1	1 1/8	1 7/8
26	4 FROM BOTTOM, COL. 1	5 1/14	5 1/4
27	2 OF COLUMN 1	3/16	13/16
27	4 OF COLUMN 1	5/16	15/16
27	14 OF COLUMN 5	1.4183	1.4813
31	7 OF COLUMN 3	0.0006	0.0056
31	11 OF COLUMN 1	MIN.6	MIN.5
35	HEADING, COLUMN 3	17/16	1 7/16
35	HEADING, COLUMN 9	13/16	1 13/16
35	13 OF COLUMN 10	1.8150	1.8153
45	2 FROM BOTTOM, COL. 1	5/16 F	5/16
46	3 FROM BOTTOM, COL. 6	9/32 IN.	1 9/32 IN.
46	2 FROM BOTTOM, COL. 6	19/64 IN.	1 19/64 IN.
46	3 FROM BOTTOM, COL. 8	8	87

SCREW THREADS AND TAP-DRILL SIZES

(Revision and Consolidation of CS24–30 and CS25–30)

COMMERCIAL STANDARD CS24–43

CONTENTS

	Page
Promulgation	II
Purpose	1
Scope	1
Definitions	2
Symbols	7
Specifications	8
American National coarse-thread series	9
American National fine-thread series	12
Uniform-pitch screw-thread series for high-pressure fastenings, boiler applications, machinery components, etc	24
Form of thread	24
Thread series	24
American National 8-pitch-thread series	24
American National 12-pitch-thread series	24
American National 16-pitch-thread series	25
American National extra-fine-thread series	38
Form of thread	38
Thread series	38
Sizes of tap drills	42
Labeling	53
Effective date	53
Standing committee	53
History of project	54
Acceptance of commercial standard	57
To the acceptors	58
Acceptors	59
Index	64
Commercial standards	66

PURPOSE

1. The purpose of this standard is to make available for convenient shop use and acceptance inspection the essential specifications, definitions, and dimensional data on screw threads and tap drills, which are recorded more completely in "Screw Thread Standards for Federal Services, 1942," National Bureau of Standards Handbook H28.

SCOPE

2. This standard covers the predominating sizes of American National Screw Threads in the following series and fits, with the corresponding tap-drill sizes:

Coarse-thread series, sizes No. 1 (0.073″) to 4″, classes 1, 2, 3, and 4 fits.

Fine-thread series, sizes No. 0 (0.060″) to 1½″, classes 1, 2, 3, and 4 fits.

8-pitch-thread series, sizes 1″ to 6″, classes 2 and 3 fits.
12-pitch-thread series, sizes ½″ to 6″, classes 2 and 3 fits.
16-pitch-thread series, sizes ¾″ to 4″, classes 2 and 3 fits.
Extra-fine-thread series, sizes ¼″ to 2″, classes 2 and 3 fits.
Tap drills for No. 1 to 3¾″ coarse-thread series.
Tap drills for No. 0 to 1½″ fine-thread series.
Tap drills for 1″ to 3½″ 8-pitch-thread series.
Tap drills for ½″ to 3½″ 12-pitch-thread series.
Tap drills for ¾″ to 3½″ 16-pitch-thread series.
Tap drills for ¼″ to 2″ extra-fine-thread series.

DEFINITIONS

3. *Terms relating to screw threads and illustrations of terminology.*

3a. *Numbering of tables and figures.*—Since most of the figures and tables herein are identical with those in National Bureau of Standards Handbook H28, they are numbered identically for convenient cross reference, even though this results in some numerical discontinuity in this standard. Figures 1, 2, 3, and 10 illustrate the terms and symbols as defined.

3b. *Screw thread.*—A ridge of uniform section in the form of a helix on the external or internal surface of a cylinder, or in the form of a conical spiral on the external or internal surface of a cone.

3c. *External and internal threads.*[1]—An external thread is a thread on the outside of a member. Example: A threaded plug.

An internal thread is a thread on the inside of a member. Example: A threaded hole.

3d. *Major diameter.*—The largest diameter of the thread of the screw or nut. The term "major diameter" replaces the term "outside diameter" as applied to the thread of a screw and also the term "full diameter" as applied to the thread of a nut.

3e. *Minor diameter.*—The smallest diameter of the thread of the screw or nut. The term "minor diameter" replaces the term "core diameter" as applied to the thread of a screw and also the term "inside diameter" as applied to the thread of a nut.

3f. *Pitch diameter.*—On a straight screw thread, the diameter of an imaginary cylinder, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cylinder. On a taper screw thread, the diameter, at a given distance from a reference plane perpendicular to the axis of an imaginary cone, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cone.

3g. *Pitch.*—The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the axis.

$$\text{The pitch, in inches,} = \frac{1}{\text{Number of threads per inch}}.$$

3h. *Lead.*—The distance a screw thread advances axially in one turn. On a single-thread screw the lead and pitch are identical; on

[1] These terms are here defined because of possible confusion arising from the fact that an "internal member" has an "external thread," and vice versa. For the sake of brevity, an external thread is hereinafter referred to as a "screw," and an internal thread as a "nut."

a double-thread screw the lead is twice the pitch; on a triple-thread screw the lead is three times the pitch, etc.

3i. *Angle of thread.*—The angle included between the sides of the thread measured in an axial plane.

3j. *Half angle of thread.*—The angle included between a side of the thread and the normal to the axis, measured in an axial plane.

3k. *Helix angle.*—The angle made by the helix, or conical spiral, of the thread at the pitch diameter with a plane perpendicular to the axis.

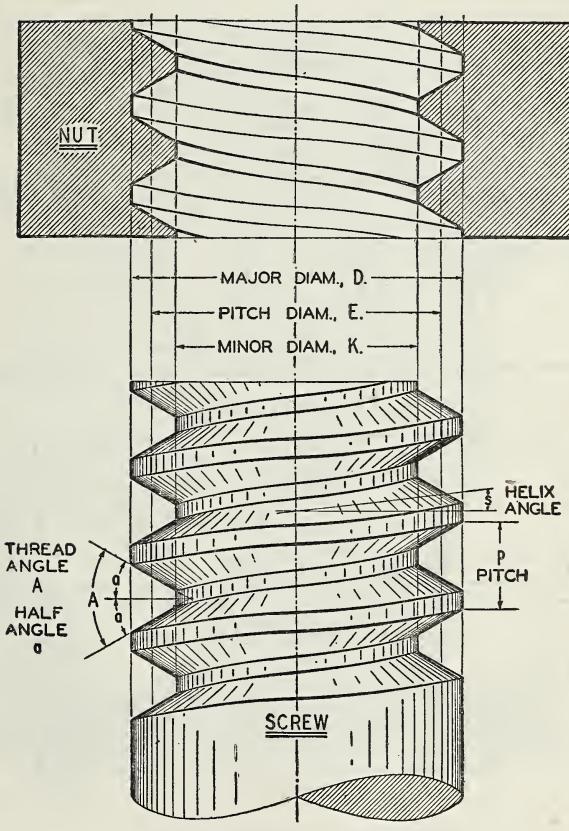

FIGURE 1.—*Screw-thread notation.*

3l. *Crest.*—The surface of the thread corresponding to the major diameter of the screw and the minor diameter of the nut.

3m. *Root.*—The surface of the thread corresponding to the minor diameter of the screw and the major diameter of the nut.

3n. *Side or flank.*—The surface of the thread which connects the crest with the root.

3o. *Axis of a screw.*—The longitudinal central line through the screw.

3p. *Base of thread.*—The bottom section of the thread; the greatest section between the two adjacent roots.

3q. *Depth of thread.*—The distance between the crest and the base of the thread measured normal to the axis.

3r. *Number of threads.*—Number of threads in 1 inch of length.

3s. *Length of engagement.*—The length of contact between two mated parts, measured axially.

3t. *Depth of engagement.*—The depth of thread contact of two mated parts, measured radially.

3u. *Pitch line.*—An element of the imaginary cylinder or cone specified in definition 3f.

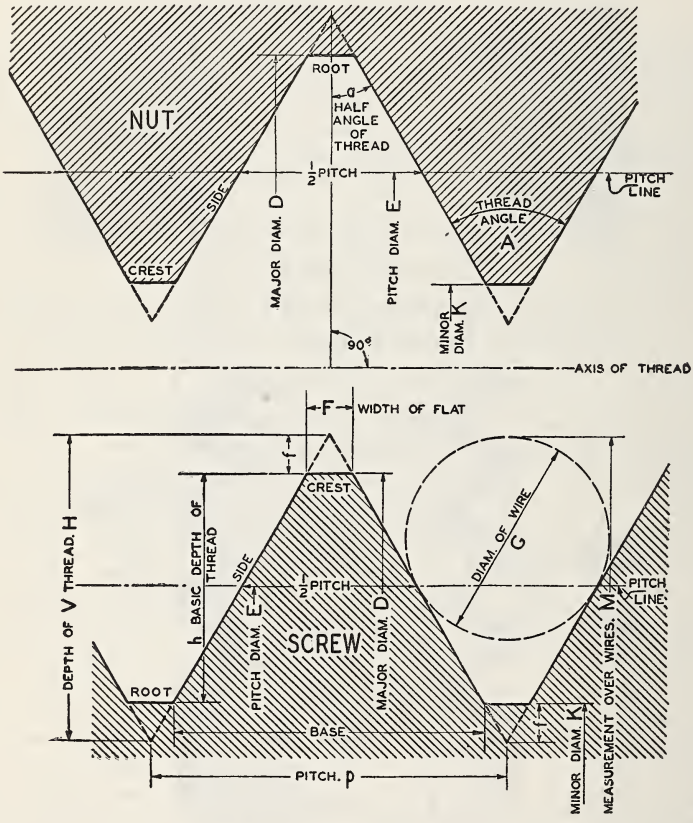

FIGURE. 2—*Screw-thread notation.*

3v. *Thickness of thread.*—The distance between the adjacent sides of the thread measured along or parallel to the pitch line.

3w. *Mean area.*—The term "mean area of a screw", when used in specifications and for other purposes, designates the cross-sectional area computed from the mean of the basic pitch and minor diameters.

4. *Terms relating to classes of fit and tolerances.*

4a. *Allowance.*—An intentional difference in the dimensions of mating parts. It is the minimum clearance or the maximum interference which is intended between mating parts. It represents the

condition of the tightest permissible fit, or the largest internal member mated with the smallest external member.
Example:

One-half inch, class 1 fit, American National coarse-thread series:	
Minimum pitch diameter of nut	0. 4500
Maximum pitch diameter of screw	. 4478
Allowance (positive)	0. 0022
One-half inch, class 4 fit, American National coarse thread series:	
Minimum pitch diameter of nut	0. 4500
Maximum pitch diameter of screw	. 4504
Allowance (negative)	0. 0004

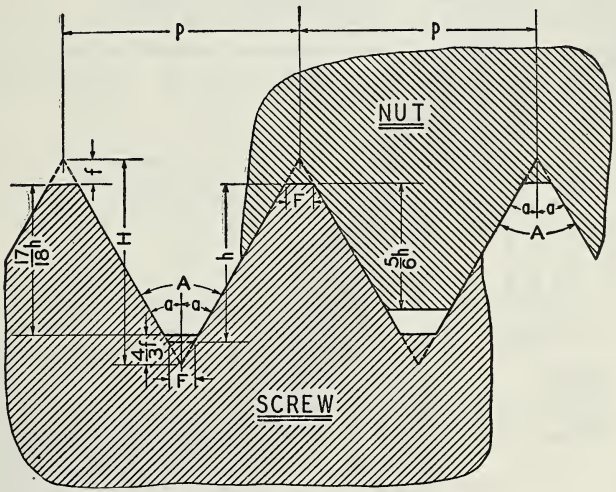

FIGURE 3.—*American National form of thread.*

NOTE.—No allowance is shown. This condition exists in classes 2 and 3 fits, where both the minimum nut and the maximum screw are basic.

NOTATION

$A=60°$
$a=30°$
n=number of threads per inch
$H=0.866025\ p$=depth of 60° sharp V thread
$h=0.649519\ p$=depth of American National form of thread
$\frac{5}{8}h=0.541266\ p$=maximum depth of engagement
$\frac{17}{18}h=0.613435\ p$
$F=0.125000\ p$=width of flat at crest and root of American National form
$f=0.108253\ p$
$=\frac{1}{8}H$
$=\frac{1}{6}h$
} =depth of truncation

4b. *Tolerance.*—The amount of variation permitted in the size of a part. Example:

One-half-inch screw, class 1 fit, American National coarse-thread series:	
Maximum pitch diameter	0. 4478
Minimum pitch diameter	. 4404
Tolerance	0. 0074

4c. *Basic size.*—The theoretical, or nominal, standard size from which all variations are made.

4d. *Crest clearance.*—Defined on a screw form as the space between the crest of a thread and the root of its mating thread.

4e. *Finish.*—The character of the surface on a screw thread or other product.

4f. *Fit.*—The relation between two mating parts with reference to the conditions of assembly, for example, classes 1, 2, 3, and 4. Each fit has its proper place, and none should be regarded as superior or

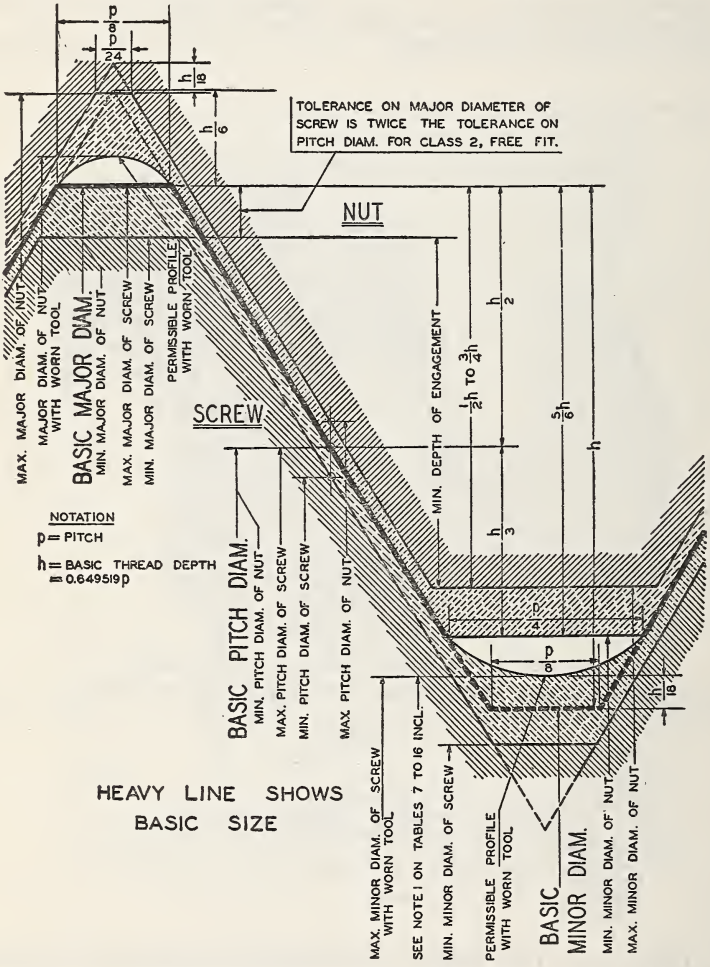

FIGURE 10.—*Illustration of tolerances and crest clearances for class 3 fit.*

inferior, provided that there is compliance with specification requirements under which it is manufactured and sold.

Class 1 fit includes screw-thread work in which the threads must assemble easily, and where an allowance is required to permit ready assembly, even when the threads are slightly bruised or dirty.

Class 2 fit represents a high quality of commercial screw-thread product and is recommended for the major portion of interchangeable screw-thread work, finished and semifinished bolts and nuts, machine screws, etc., where no allowance is required.

Class 3 fit is the same in every particular as class 2 fit except that the tolerances are smaller. The class 3 fit is intended to apply to interchangeable screw-thread work requiring the smallest practicable tolerances. Tapped holes within class 3 tolerances are difficult and expensive to produce commercially.

Class 4 fit is designed for screw-thread work where extremely close tolerances are required. In the manufacture of screw-thread products to this class of fit, it will be necessary to use precision tools, gages made to special tolerances, and other refinements. This class of fit should, therefore, be used only in cases where the requirements of the mechanism being produced are exacting, or where there are special conditions which make this class of fit necessary. In order to ensure assembly with the degree of tightness desired, it may be necessary, in some cases, to select the parts when the product is being assembled.

4g. *Neutral zone.*—A positive allowance. (*See* Allowance, par. 4a.)

4h. *Limits.*—The extreme permissible dimensions of a part. Example:

One-half-inch screw, class 1 fit, American National coarse-thread series:

Maximum pitch diameter	0.4478	These are the limits.
Minimum pitch diameter	.4404	

SYMBOLS

5. Symbols for designating screw-thread standards and thread dimensions are a necessity in commercial and engineering practice. The standardization of such symbols yields the usual advantages of standardization. Those listed below have been in customary use for many years, and their general use in standards, specifications, and textbooks is recommended.

6. *Identification symbols.*—These are for use on correspondence, drawings, shop and storeroom cards, specifications for parts, taps, dies, gages, etc., and on tools and gages.

6a. The method of designating a screw thread by means of symbols is by the use of the initial letters of the thread series preceded by the diameter in inches (or the screw number) and number of threads per inch, all in Arabic characters, and followed by the classification of fit in Arabic numerals. If the thread is left hand, the symbol "LH" shall follow the class of fit. No symbol is used to distinguish right-hand threads. The number of threads per inch shall be indicated in all cases, irrespective of whether it is the standard number of threads for that particular size of threaded part or special. For screw threads of American National form but of special diameters, pitches, and lengths of engagement, the symbol "NS" shall be used. Examples:

	Mark
American National coarse-thread series:	
To specify a threaded part 1 inch in diameter, 8 threads per inch, class 1 fit	1″—8NC—1
Threaded part 1 inch in diameter, 8 threads per inch, class 2 fit, left hand	1″—8NC—2LH
American National fine-thread series:	
Threaded part 1 inch in diameter, 14 threads per inch, class 4 fit	1″—14NF—4
Threaded part ⅝ inch in diameter, 18 threads per inch, class 5 fit	⅝″—18NF—5
Threaded part, ⅛ inch in diameter, 44 threads per inch, class 2 fit	5—44NF—2

500932°—43——2

	Mark
American National 8-, 12-, or 16-pitch-thread series:	
Threaded part 1 inch in diameter, 12 threads per inch, class 3 fit	1″—12N—3
Threaded part 1½ inches in diameter, 8 threads per inch, class 2 fit, left hand	1½″—8N—2LH
American National extra-fine-thread series:	
Threaded part 1 inch in diameter, 20 threads per inch, class 3 fit	1″—20NEF—3
American National form, special pitch:	
Threaded part 1 inch in diameter, 18 threads per inch, class 2 fit	1″—18NS—2
Threaded part 1¼ inches in diameter, 20 threads per inch, class 3 fit, left hand	1¼″—20NS—3LH

SPECIFICATIONS

7. *American National form of thread.*—The form of thread profile specified herein, known previously as the "United States Standard or Sellers' profile", is adopted and shall hereafter be known as the "American National form of thread".[2]

7a. *Angle of thread.*—The basic angle of thread (*A*, fig. 3) between the sides of the thread measured in an axial plane is 60°. The line bisecting this 60° angle is perpendicular to the axis of the screw thread.

7b. *Flat at crest and root.*—The flat at the root and crest of the basic thread form is $\frac{1}{8}\times p$, or $0.125\times p$.

7c. *Depth of thread.*—The depth of the basic thread form is

$$h=0.649519\times p, \text{ or } h=\frac{0.649519}{n},$$

where

p=pitch in inches.
n=number of threads per inch.
h=basic depth of thread.

7d. *Clearance at minor diameter.*—A clearance shall be provided at the minor diameter of the nut by removing from the crest of the basic thread form an amount such as to provide a depth of thread not less than 53 to 75 percent (depending on the size), and not more than 83⅓ percent of the basic thread depth.

7e. *Clearance at major diameter.*—A clearance shall be provided at the major diameter of the nut by making the thread form such that the width of flat shall be less than $\frac{1}{8}\times p$, but not less than $\frac{1}{24}\times p$.

7f. *Thread series.*—The present coarse-thread and fine-thread series are maintained, the coarse-thread series being the "United States standard" threads, supplemented in the sizes below one-fourth inch by sizes taken from the standard established by the American Society of Mechanical Engineers (ASME). The fine-thread series is composed of standards that have been found necessary and consists of sizes taken from the standards of the Society of Automotive Engineers (SAE) and the fine-thread series of the ASME.

7g. There are indicated in figure 3 the relations as specified herein for the American National form of thread for the minimum nut and maximum screw, classes 2 and 3 fits.

[2] This standard, in substantially the same form, has been adopted by the American Standards Association. It is published, in part, as ASA B1. 1—1935, Screw Threads, by the ASME, 29 West 39th Street, New York, N. Y.

AMERICAN NATIONAL COARSE-THREAD SERIES

8a. The American National coarse-thread series, as specified in table 1, is recommended for general use in engineering work, in machine construction where conditions are favorable to the use of bolts, screws, and other threaded components where quick and easy assembly of the parts is desired, and for all work where conditions do not require the use of fine-pitch threads. Limiting dimensions and tolerances for classes 1, 2, 3, and 4 fits are specified in table 15.

TABLE 1.—*American National coarse-thread series*

Identification	Basic diameters					Thread data					
Sizes	Threads per inch, n	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Pitch, p	Depth of thread, h	Basic width of flat, $p/8$	Minimum width of flat at major diameter of nut, $p/24$	Helix angle at basic pitch diameter, s	Basic area of section at root of thread, $\frac{\pi K^2}{4}$
		Inches	*Inches*	*Inches*	*mm*	*Inch*	*Inch*	*Inch*	*Inch*	*Deg. Min.*	*Sq. in.*
1	64	0. 073	0. 0629	0. 0527	1. 854	0. 01562	0. 01015	0. 00195	0. 00065	4 31	0. 0022
2	56	. 086	. 0744	. 0628	2. 184	. 01786	. 01160	. 00223	. 00074	4 22	. 0031
3	48	. 099	. 0855	. 0719	2. 515	. 02083	. 01353	. 00260	. 00087	4 26	. 0041
4	40	. 112	. 0958	. 0795	2. 845	. 02500	. 01624	. 00312	. 00104	4 45	. 0050
5	40	. 125	. 1088	. 0925	3. 175	. 02500	. 01624	. 00312	. 00104	4 11	. 0067
6	32	. 138	. 1177	. 0974	3. 505	. 03125	. 02030	. 00391	. 00130	4 50	. 0075
8	32	. 164	. 1437	. 1234	4. 166	. 03125	. 02030	. 00391	. 00130	3 58	. 0120
10	24	. 190	. 1629	. 1359	4. 826	. 04167	. 02706	. 00521	. 00174	4 39	. 0145
12	24	. 216	. 1889	. 1619	5. 486	. 04167	. 02706	. 00521	. 00174	4 1	. 0206
¼	20	. 2500	. 2175	. 1850	6. 350	. 05000	. 03248	. 00625	. 00208	4 11	. 0269
5/16	18	. 3125	. 2764	. 2403	7. 938	. 05556	. 03608	. 00694	. 00231	3 40	. 0454
⅜	16	. 3750	. 3344	. 2938	9. 525	. 06250	. 04059	. 00781	. 00260	3 24	. 0678
7/16	14	. 4375	. 3911	. 3447	11. 113	. 07143	. 04639	. 00893	. 00298	3 20	. 0933
½	13	. 5000	. 4500	. 4001	12. 700	. 07692	. 04996	. 00962	. 00321	3 7	. 1257
9/16	12	. 5625	. 5084	. 4542	14. 288	. 08333	. 05413	. 01042	. 00347	2 59	. 1620
⅝	11	. 6250	. 5660	. 5069	15. 875	. 09091	. 05905	. 01136	. 00379	2 56	. 2018
¾	10	. 7500	. 6850	. 6201	19. 050	. 10000	. 06495	. 01250	. 00417	2 40	. 3020
⅞	9	. 8750	. 8028	. 7307	22. 225	. 11111	. 07217	. 01389	. 00463	2 31	. 4193
1	8	1. 0000	. 9188	. 8376	25. 400	. 12500	. 08119	. 01562	. 00521	2 29	. 5510

1⅛	7	1. 1250	1. 0322	. 9394	28. 575	. 14286	. 09279	. 01786	. 00595	2	31	. 6931
1¼	7	1. 2500	1. 1572	1. 0644	31. 750	. 14286	. 09279	. 01786	. 00595	2	15	. 8898
1⅜	6	1. 3750	1. 2667	1. 1585	34. 925	. 16667	. 10825	. 02083	. 00694	2	24	1. 0541
1½	6	1. 5000	1. 3917	1. 2835	38. 100	. 16667	. 10825	. 02083	. 00694	2	11	1. 2938
1¾	5	1. 7500	1. 6201	1. 4902	44. 450	. 20000	. 12990	. 02500	. 00833	2	15	1. 7441
2	4½	2. 0000	1. 8557	1. 7113	50. 800	. 22222	. 14434	. 02778	. 00926	2	11	2. 3001
2¼	4½	2. 2500	2. 1057	1. 9613	57. 150	. 22222	. 14434	. 02778	. 00926	1	55	3. 0212
2½	4	2. 5000	2. 3376	2. 1752	63. 500	. 25000	. 16238	. 03125	. 01042	1	57	3. 7161
2¾	4	2. 7500	2. 5876	2. 4252	69. 850	. 25000	. 16238	. 03125	. 01042	1	46	4. 6194
3	4	3. 0000	2. 8376	2. 6752	76. 200	. 25000	. 16238	. 03125	. 01042	1	36	5. 6209
3¼	4	3. 2500	3. 0876	2. 9252	82. 550	. 25000	. 16238	. 03125	. 01042	1	29	6. 7205
3½	4	3. 5000	3. 3376	3. 1752	88. 900	. 25000	. 16238	. 03125	. 01042	1	22	7. 9183
3¾	4	3. 7500	3. 5876	3. 4252	95. 250	. 25000	. 16238	. 03125	. 01042	1	16	9. 2143
4	4	4. 0000	3. 8376	3. 6752	101. 600	. 25000	. 16238	. 03125	. 01042	1	11	10. 6084

AMERICAN NATIONAL FINE-THREAD SERIES

8b. The American National fine-thread series as specified in table 2 is recommended for general use in automotive and aircraft work, and where special conditions require a fine thread. Limiting dimensions and tolerances for classes 1, 2, 3, and 4 fits are specified in table 16.

TABLE 2.—*American National fine-thread series*

Identification		Basic diameters			Thread data							
Sizes	Threads per inch, n	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Pitch, p	Depth of thread, h	Basic width of flat, $p/8$	Minimum width of flat at major diameter of nut, $p/24$	Helix angle at basic pitch diameter, s		Basic area of section at root of thread, $\frac{\pi K^2}{4}$
		Inches	*Inches*	*Inches*	*mm*	*Inch*	*Inch*	*Inch*	*Inch*	*Deg.*	*Min.*	*Sq. in.*
0	80	0. 060	0. 0519	0. 0438	1. 524	0. 01250	0. 00812	0. 00156	0. 00052	4	23	0. 0015
1	72	. 073	. 0640	. 0550	1. 854	. 01389	. 00902	. 00174	. 00058	3	57	. 0024
2	64	. 086	. 0759	. 0657	2. 184	. 01562	. 01015	. 00195	. 00065	3	45	. 0034
3	56	. 099	. 0874	. 0758	2. 515	. 01786	. 01160	. 00223	. 00074	3	43	. 0045
4	48	. 112	. 0985	. 0849	2. 845	. 02083	. 01353	. 00260	. 00087	3	51	. 0057
5	44	. 125	. 1102	. 0955	3. 175	. 02273	. 01476	. 00284	. 00095	3	45	. 0072
6	40	. 138	. 1218	. 1055	3. 505	. 02500	. 01624	. 00312	. 00104	3	44	. 0087
8	36	. 164	. 1460	. 1279	4. 166	. 02778	. 01804	. 00347	. 00116	3	28	. 0128
10	32	. 190	. 1697	. 1494	4. 826	. 03125	. 02030	. 00391	. 00130	3	21	. 0175
12	28	. 216	. 1928	. 1696	5. 486	. 03571	. 02320	. 00446	. 00149	3	22	. 0226
1/4	28	. 2500	. 2268	. 2036	6. 350	. 03571	. 02320	. 00446	. 00149	2	52	. 0326
5/16	24	. 3125	. 2854	. 2584	7. 938	. 04167	. 02706	. 00521	. 00174	2	40	. 0524
3/8	24	. 3750	. 3479	. 3209	9. 525	. 04167	. 02706	. 00521	. 00174	2	11	. 0809
7/16	20	. 4375	. 4050	. 3725	11. 113	. 05000	. 03248	. 00625	. 00208	2	15	. 1090
1/2	20	. 5000	. 4675	. 4350	12. 700	. 05000	. 03248	. 00625	. 00208	1	57	. 1486
9/16	18	. 5625	. 5264	. 4903	14. 288	. 05556	. 03608	. 00694	. 00231	1	55	. 1888
5/8	18	. 6250	. 5889	. 5528	15. 875	. 05556	. 03608	. 00694	. 00231	1	43	. 2400
3/4	16	. 7500	. 7094	. 6688	19. 050	. 06250	. 04059	. 00781	. 00260	1	36	. 3513
7/8	14	. 8750	. 8286	. 7822	22. 225	. 07143	. 04639	. 00893	. 00298	1	34	. 4805
1	14	1. 0000	. 9536	. 9072	25. 400	. 07143	. 04639	. 00893	. 00298	1	22	. 6464
1 1/8	12	1. 1250	1. 0709	1. 0167	28. 575	. 08333	. 05413	. 01042	. 00347	1	25	. 8118
1 1/4	12	1. 2500	1. 1959	1. 1417	31. 750	. 08333	. 05413	. 01042	. 00347	1	16	1. 0238
1 3/8	12	1. 3750	1. 3209	1. 2667	34. 925	. 08333	. 05413	. 01042	. 00347	1	9	1. 2602
1 1/2	12	1. 5000	1. 4459	1. 3917	38. 100	. 08333	. 05413	. 01042	. 00347	1	3	1. 5212

TABLE 15.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series*

Dimensions and tolerances		Machine screw number or nominal size										
		1	2	3	4	5	6	8	10	12	¼	5/16
		Threads per inch										
		64	56	48	40	40	32	32	24	24	20	18
BOLTS AND SCREWS		*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*
Class 1, major diameter	Max.	0. 0723	0. 0852	0. 0981	0. 1110	0. 1240	0. 1369	0. 1629	0. 1887	0. 2147	0. 2485	0. 3109
	Min.	. 0671	. 0796	. 0919	. 1042	. 1172	. 1293	. 1553	. 1795	. 2055	. 2383	. 2995
	Tol.	. 0052	. 0056	. 0062	. 0068	. 0068	. 0076	. 0076	. 0092	. 0092	. 0102	. 0114
Classes 2, 3, and 4, major diameter	Max.	. 0730	. 0860	. 0990	. 1120	. 1250	. 1380	. 1640	. 1900	. 2160	. 2500	. 3125
	Min.	. 0692	. 0820	. 0946	. 1072	. 1202	. 1326	. 1586	. 1834	. 2094	. 2428	. 3043
	Tol.	. 0038	. 0040	. 0044	. 0048	. 0048	. 0054	. 0054	. 0066	. 0066	. 0072	. 0082
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)	Max.	. 0730	. 0860	. 0990	. 1120	. 1250	. 1380	. 1640	. 1900	. 2160	. 2500	. 3125
	Min.	. 0678	. 0804	. 0928	. 1052	. 1182	. 1304	. 1564	. 1808	. 2068	. 2398	. 3011
	Tol.	. 0052	. 0056	. 0062	. 0068	. 0068	. 0076	. 0076	. 0092	. 0092	. 0102	. 0114
Class 1, minor diameter	Max.[1]	. 0531	. 0633	. 0725	. 0803	. 0933	. 0986	. 1246	. 1376	. 1636	. 1872	. 2427
Classes 2, 3, and 4, minor diameter	Max.[1]	. 0538	. 0641	. 0734	. 0813	. 0943	. 0997	. 1257	. 1389	. 1649	. 1887	. 2443
Class 1, pitch diameter	Max.	. 0622	. 0736	. 0846	. 0948	. 1078	. 1166	. 1426	. 1616	. 1876	. 2160	. 2748
	Min.	. 0596	. 0708	. 0815	. 0914	. 1044	. 1128	. 1388	. 1570	. 1830	. 2109	. 2691
	Tol.	. 0026	. 0028	. 0031	. 0034	. 0034	. 0038	. 0038	. 0046	. 0046	. 0051	. 0057
Class 2, pitch diameter	Max.	. 0629	. 0744	. 0855	. 0958	. 1088	. 1177	. 1437	. 1629	. 1889	. 2175	. 2764
	Min.	. 0610	. 0724	. 0833	. 0934	. 1064	. 1150	. 1410	. 1596	. 1856	. 2139	. 2723
	Tol.	. 0019	. 0020	. 0022	. 0024	. 0024	. 0027	. 0027	. 0033	. 0033	. 0036	. 0041

Class 3, pitch diameter	Max	.0629	.0744	.0855	.0958	.1088	.1177	.1437	.1629	.1889	.2175	.2764
	Min	.0615	.0729	.0839	.0941	.1071	.1158	.1418	.1605	.1865	.2149	.2734
	Tol	.0014	.0015	.0016	.0017	.0017	.0019	.0019	.0024	.0024	.0026	.0030
Class 4, pitch diameter	Max										.2178	.2767
	Min										.2165	.2752
	Tol										.0013	.0015
Nuts and Tapped Holes												
Classes 1, 2, 3, and 4, major diameter	Min.[2]	0.0730	0.0860	0.0990	0.1120	0.1250	0.1380	0.1640	0.1900	0.2160	0.2500	0.3125
Classes 1, 2, 3, and 4, minor diameter	Max.[3]	.0623	.0737	.0841	.0938	.1062	.1145	.1384	.1559	.1801	.2060	.2630
	Min	.0561	.0667	.0764	.0849	.0979	.1042	.1302	.1449	.1709	.1959	.2524
	Tol	.0062	.0070	.0077	.0089	.0083	.0103	.0082	.0110	.0092	.0101	.0106
Classes 1, 2, 3, and 4, pitch diameter	Min	.0629	.0744	.0855	.0958	.1088	.1177	.1437	.1629	.1889	.2175	.2764
Class 1, pitch diameter	Max.[4]	.0655	.0772	.0886	.0992	.1122	.1215	.1475	.1675	.1935	.2226	.2821
	Tol	.0026	.0028	.0031	.0034	.0034	.0038	.0038	.0046	.0046	.0051	.0057
Class 2, pitch diameter	Max.[4]	.0648	.0764	.0877	.0982	.1112	.1204	.1464	.1662	.1922	.2211	.2805
	Tol	.0019	.0020	.0022	.0024	.0024	.0027	.0027	.0033	.0033	.0036	.0041
Class 3, pitch diameter	Max.[4]	.0643	.0759	.0871	.0975	.1105	.1196	.1456	.1653	.1913	.2201	.2794
	Tol	.0014	.0015	.0016	.0017	.0017	.0019	.0019	.0024	.0024	.0026	.0030
Class 4, pitch diameter	Max.[4]										.2188	.2779
	Tol										.0013	.0015

See footnotes at end of table.

TABLE 15.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series*—Continued

Dimensions and tolerances		Machine screw number or nominal size										
		3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8
		Threads per inch										
		16	14	13	12	11	10	9	8	7	7	6
BOLTS AND SCREWS		*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inches*	*Inches*	*Inches*
Class 1, major diameter	Max	0. 3732	0. 4354	0. 4978	0. 5601	0. 6224	0. 7472	0. 8719	0. 9966	1. 1211	1. 2461	1. 3706
	Min	. 3606	. 4214	. 4830	. 5443	6054	. 7288	. 8519	. 9744	1. 0963	1. 2213	1. 3416
	Tol	. 0126	. 0140	. 0148	. 0158	. 0170	. 0184	. 0200	. 0222	0. 0248	0. 0248	0. 0290
Classes 2, 3, and 4, major diameter	Max	. 3750	. 4375	. 5000	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500	1. 3750
	Min	. 3660	. 4277	. 4896	. 5513	. 6132	. 7372	. 8610	0. 9843	1. 1080	1. 2330	1. 3548
	Tol	. 0090	. 0098	. 0104	. 0112	. 0118	. 0128	. 0140	. 0152	0. 0170	0. 0170	0. 0202
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)	Max	. 3750	. 4375	. 5000	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500	1. 3750
	Min	. 3624	. 4235	. 4852	. 5467	. 6080	. 7316	. 8550	0. 9778	1. 1002	1. 2252	1. 3460
	Tol	. 0126	. 0140	. 0148	. 0158	. 0170	. 0184	. 0200	. 0222	0. 0248	0. 0248	0. 0290
Class 1, minor diameter	Max [1]	. 2965	. 3478	. 4034	. 4579	. 5109	. 6245	. 7356	. 8432	. 9458	1. 0708	1. 1661
Classes 2, 3, and 4, minor diameter	Max [1]	. 2983	. 3499	. 4056	. 4603	. 5135	. 6273	. 7387	. 8466	. 9497	1. 0747	1. 1705
Class 1, pitch diameter	Max	. 3326	. 3890	. 4478	. 5060	. 5634	. 6822	. 7997	. 9154	1. 0283	1. 1533	1. 2623
	Min	. 3263	. 3820	. 4404	. 4981	. 5549	. 6730	. 7897	. 9043	1. 0159	1. 1409	1. 2478
	Tol	. 0063	. 0070	. 0074	. 0079	. 0085	. 0092	. 0100	. 0111	0. 0124	0. 0124	0. 0145
Class 2, pitch diameter	Max	. 3344	. 3911	. 4500	. 5084	. 5660	. 6850	. 8028	. 9188	1. 0322	1. 1572	1. 2667
	Min	. 3299	. 3862	. 4448	. 5028	. 5601	. 6786	. 7958	. 9112	1. 0237	1. 1487	1. 2566
	Tol	. 0045	. 0049	. 0052	. 0056	. 0059	. 0064	. 0070	. 0076	0. 0085	0. 0085	0. 0101

Class 3, pitch diameter	Max	.3344	.3911	.4500	.5084	.5660	.6850	.8028	.9188	1.0322	1.1572	1.2667
	Min	.3312	.3875	4463	.5044	.5618	.6805	.7979	.9134	1.0263	1.1513	1.2596
	Tol	.0032	.0036	.0037	.0040	.0042	.0045	.0049	.0054	0.0059	0.0059	0.0071
Class 4, pitch diameter	Max	.3348	.3915	.4504	.5089	.5665	.6856	.8034	.9195	1.0330	1.1580	1.2676
	Min	.3332	.3897	.4485	.5069	.5644	.6833	.8010	.9168	1.0300	1.1550	1.2640
	Tol	.0016	.0018	.0019	.0020	.0021	.0023	.0024	.0027	0.0030	0.0030	0.0036
Nuts and Tapped Holes												
Classes 1, 2, 3, and 4, major diameter	Min [2]	0.3750	0.4375	0.5000	0.5625	0.6250	0.7500	0.8750	1.0000	1.1250	1.2500	1.3750
Classes 1, 2, 3, and 4, minor diameter	Max [3]	.3184	.3721	.4290	.4850	.5397	.6553	.7689	0.8795	0.9858	1.1108	1.2126
	Min	.3073	.3602	.4167	.4723	.5266	.6417	.7547	.8647	.9704	1.0954	1.1946
	Tol	.0111	.0119	.0123	.0127	.0131	.0136	.0142	.0148	.0154	0.0154	0.0180
Classes 1, 2, 3, and 4, pitch diameter	Min	.3344	3911	.4500	.5084	.5660	.6850	.8028	.9188	1.0322	1.1572	1.2667
Class 1, pitch diameter	Max [4]	.3407	.3981	.4574	.5163	.5745	.6942	.8128	.9299	1.0446	1.1696	1.2812
	Tol	.0063	.0070	.0074	.0079	.0085	.0092	.0100	.0111	0.0124	0.0124	0.0145
Class 2, pitch diameter	Max [4]	.3389	.3960	.4552	.5140	.5719	.6914	.8098	.9264	1.0407	1.1657	1.2768
	Tol	.0045	.0049	.0052	.0056	.0059	.0064	.0070	.0076	0.0085	0.0085	0.0101
Class 3, pitch diameter	Max [4]	.3376	.3947	.4537	.5124	.5702	.6895	.8077	.9242	1.0381	1.1631	1.2738
	Tol	.0032	.0036	.0037	.0040	.0042	.0045	.0049	.0054	0.0059	0.0059	0.0071
Class 4, pitch diameter	Max [4]	.3360	.3929	.4519	.5104	.5681	.6873	.8052	.9215	1.0352	1.1602	1.2703
	Tol	.0016	.0018	.0019	.0020	.0021	.0023	.0024	.0027	0.0030	0.0030	0.0036

See footnotes at end of table.

TABLE 15.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series*—Continued

Dimensions and tolerances	Size										
	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
	Threads per inch										
	6	5	4½	4½	4	4	4	4	4	4	4
BOLTS AND SCREWS	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Class 1, major diameter—Max.	1. 4956	1. 7448	1. 9943	2. 2443	2. 4936	2. 7436	2. 9936	3. 2436	3. 4936	3. 7436	3. 9936
Class 1, major diameter—Min.	1. 4666	1. 7110	1. 9575	2. 2075	2. 4528	2. 7028	2. 9528	3. 2028	3. 4528	3. 7028	3. 9528
Class 1, major diameter—Tol.	0. 0290	0. 0338	0. 0368	0. 0368	0. 0408	0. 0408	0. 0408	0. 0408	0. 0408	0. 0408	0. 0408
Classes 2, 3, and 4, major diameter—Max.	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500	3. 0000	3. 2500	3. 5000	3. 7500	4. 0000
Classes 2, 3, and 4, major diameter—Min.	1. 4798	1. 7268	1. 9746	2. 2246	2. 4720	2. 7220	2. 9720	3. 2220	3. 4720	3. 7220	3. 9720
Classes 2, 3, and 4, major diameter—Tol.	0. 0202	0. 0232	0. 0254	0. 0254	0. 0280	0. 0280	0. 0280	0. 0280	0. 0280	0. 0280	0. 0280
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)—Max.	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500	3. 0000	3. 2500	3. 5000	3. 7500	4. 0000
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)—Min.	1. 4710	1. 7162	1. 9632	2. 2132	2. 4592	2. 7092	2. 9592	3. 2092	3. 4592	3. 7092	3. 9592
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)—Tol.	0. 0290	0. 0338	0. 0368	0. 0368	0. 0408	0. 0408	0. 0408	0. 0408	0. 0408	0. 0408	0. 0408
Class 1 minor diameter—Max.[1]	1. 2911	1. 4994	1. 7217	1. 9717	2. 1869	2. 4369	2. 6869	2. 9369	3. 1869	3. 4369	3. 6869
Classes 2, 3, and 4, minor diameter—Max.[1]	1. 2955	1. 5046	1. 7274	1. 9774	2. 1933	2. 4433	2. 6933	2. 9433	3. 1933	3. 4433	3. 6933
Class 1, pitch diameter—Max.	1. 3873	1. 6149	1. 8500	2. 1000	2. 3312	2. 5812	2. 8312	3. 0812	3. 3312	3. 5812	3. 8312
Class 1, pitch diameter—Min.	1. 3728	1. 5980	1. 8316	2. 0816	2. 3108	2. 5608	2. 8108	3. 0608	3. 3108	3. 5608	3. 8108
Class 1, pitch diameter—Tol.	0. 0145	0. 0169	0. 0184	0. 0184	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204
Class 2, pitch diameter—Max.	1. 3917	1. 6201	1. 8557	2. 1057	2. 3376	2. 5876	2. 8376	3. 0876	3. 3376	3. 5876	3. 8376
Class 2, pitch diameter—Min.	1. 3816	1. 6085	1. 8430	2. 0930	2. 3236	2. 5736	2. 8236	3. 0736	3. 3236	3. 5736	3. 8236
Class 2, pitch diameter—Tol.	0. 0101	0. 0116	0. 0127	0. 0127	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140

Class 3, pitch diameter	Max	1. 3917	1. 6201	1. 8557	2. 1057	2. 3376	2. 5876	2. 8376	3. 0876	3. 3376	3. 5876	3. 8376
	Min	1. 3846	1. 6119	1. 8468	2. 0968	2. 3279	2. 5779	2. 8279	3. 0779	3. 3279	3. 5779	3. 8279
	Tol	0. 0071	0. 0082	0. 0089	0. 0089	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097
Class 4, pitch diameter	Max	1. 3926	1. 6211	1. 8568	2. 1068	2. 3389	2. 5889	2. 8389	3. 0889	3. 3389	3. 5889	3. 8389
	Min	1. 3890	1. 6170	1. 8524	2. 1024	2. 3341	2. 5841	2. 8341	3. 0841	3. 3341	3. 5841	3. 8341
	Tol	0. 0036	0. 0041	0. 0044	0. 0044	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048
Nuts and Tapped Holes												
Classes 1, 2, 3, and 4, major diameter	Min.[2]	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500	3. 0000	3. 2500	3. 5000	3. 7500	4. 0000
Classes 1, 2, 3, and 4, minor diameter	Max.[3]	1. 3376	1. 5551	1. 7835	2. 0335	2. 2564	2. 5064	2. 7564	3. 0064	3. 2564	3. 5064	3. 7564
	Min	1. 3196	1. 5335	1. 7594	2. 0094	2. 2294	2. 4794	2. 7294	2. 9794	3. 2294	3. 4794	3. 7294
	Tol	0. 0180	0. 0216	0. 0241	0. 0241	0. 0270	0. 0270	0. 0270	0. 0270	0. 0270	0. 0270	0. 0270
Classes 1, 2, 3, and 4, pitch diameter	Min	1. 3917	1. 6201	1. 8557	2. 1057	2. 3376	2. 5876	2. 8376	3. 0876	3. 3376	3. 5876	3. 8376
Class 1, pitch diameter	Max.[4]	1. 4062	1. 6370	1. 8741	2. 1241	2. 3580	2. 6080	2. 8580	3. 1080	3. 3580	3. 6080	3. 8580
	Tol	0. 0145	0. 0169	0. 0184	0. 0184	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204
Class 2, pitch diameter	Max.[4]	1. 4018	1. 6317	1. 8684	2. 1184	2. 3516	2. 6016	2. 8516	3. 1016	3. 3516	3. 6016	3. 8516
	Tol	0. 0101	0. 0116	0. 0127	0. 0127	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140
Class 3, pitch diameter	Max.[4]	1. 3988	1. 6283	1. 8646	2. 1146	2. 3473	2. 5973	2. 8473	3. 0973	3. 3473	3. 5973	3. 8473
	Tol	0. 0071	0. 0082	0. 0089	0. 0089	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097
Class 4, pitch diameter	Max.[4]	1. 3953	1. 6242	1. 8601	2. 1101	2. 3424	2. 5924	2. 8424	3. 0924	3. 3424	3. 5924	3. 8424
	Tol	0. 0036	0. 0041	0. 0044	0. 0044	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048

[1] Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to $\frac{1}{8} \times p$, and may be determined by subtracting the basic thread depth, h (or 0.6495 p), from the minimum pitch diameter of the screw.

[2] Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8} \times p$) and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to $\frac{1}{24} \times p$, and may be determined by adding $1\frac{1}{16} \times h$ (or 0.7939 p) to the maximum pitch diameter of the nut.

[3] Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

[4] These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

TABLE 16.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National fine-thread series*

Dimensions and tolerances	Machine screw number or nominal size													
	0	1	3	3	4	5	6	8	10	12	¼	5/16	3/8	7/16
	Threads per inch													
	80	72	64	56	48	44	40	36	32	28	28	24	24	20
BOLTS AND SCREWS	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*
Class 1, major diam—Max	0. 0593	0. 0723	0. 0853	0. 0982	0. 1111	0. 1241	0. 1370	0. 1629	0. 1889	0. 2148	0. 2488	0. 3112	0. 3737	0. 4360
Class 1, major diam—Min	. 0545	. 0673	. 0801	. 0926	. 1049	. 1177	. 1302	. 1557	. 1813	. 2062	. 2402	. 3020	. 3645	. 4258
Class 1, major diam—Tol	. 0048	. 0050	. 0052	. 0056	. 0062	. 0064	. 0068	. 0072	. 0076	. 0086	. 0086	. 0092	. 0092	. 0102
Classes 2, 3, and 4, major diam—Max	. 0600	. 0730	. 0860	. 0990	. 1120	. 1250	. 1380	. 1640	. 1900	. 2160	. 2500	. 3125	. 3750	. 4375
Classes 2, 3, and 4, major diam—Min	. 0566	. 0694	. 0822	. 0950	. 1076	. 1204	. 1332	. 1590	. 1846	. 2098	. 2438	. 3059	. 3684	. 4303
Classes 2, 3, and 4, major diam—Tol	. 0034	. 0036	. 0038	. 0040	. 0044	. 0046	. 0048	. 0050	. 0054	. 0062	. 0062	. 0066	. 0066	. 0072
Class 1, minor diam—Max.[1]	. 0440	. 0553	. 0661	. 0763	. 0855	. 0962	. 1063	. 1288	. 1506	. 1710	. 2050	. 2601	. 3226	. 3747
Classes 2, 3, and 4, minor diam—Max.[1]	. 0447	. 0560	. 0668	. 0771	. 0864	. 0971	. 1073	. 1299	. 1517	. 1722	. 2062	. 2614	. 3239	. 3762
Class 1, pitch diam—Max	. 0512	. 0633	. 0752	. 0866	. 0976	. 1093	. 1208	. 1449	. 1686	. 1916	. 2256	. 2841	. 3466	. 4035
Class 1, pitch diam—Min	. 0488	. 0608	. 0726	. 0838	. 0945	. 1061	. 1174	. 1413	. 1648	. 1873	. 2213	. 2795	. 3420	. 3984
Class 1, pitch diam—Tol	. 0024	. 0025	. 0026	. 0028	. 0031	. 0032	. 0034	. 0036	. 0038	. 0043	. 0043	. 0046	. 0046	. 0051
Class 2, pitch diam—Max	. 0519	. 0640	. 0759	. 0874	. 0985	. 1102	. 1218	. 1460	. 1697	. 1928	. 2268	. 2854	. 3479	. 4050
Class 2, pitch diam—Min	. 0502	. 0622	. 0740	. 0854	. 0963	. 1079	. 1194	. 1435	. 1670	. 1897	. 2237	. 2821	. 3446	. 4014
Class 2, pitch diam—Tol	. 0017	. 0018	. 0019	. 0020	. 0022	. 0023	. 0024	. 0025	. 0027	. 0031	. 0031	. 0033	. 0033	. 0036
Class 3, pitch diam—Max	. 0519	. 0640	. 0759	. 0874	. 0985	. 1102	. 1218	. 1460	. 1697	. 1928	. 2268	. 2854	. 3479	. 4050
Class 3, pitch diam—Min	. 0506	. 0627	. 0745	. 0859	. 0969	. 1086	. 1201	. 1442	. 1678	. 1906	. 2246	. 2830	. 3455	. 4024
Class 3, pitch diam—Tol	. 0013	. 0013	. 0014	. 0015	. 0016	. 0016	. 0017	. 0018	. 0019	. 0022	. 0022	. 0024	. 0024	. 0026
Class 4, pitch diam—Max	------	------	------	------	------	------	------	------	------	------	. 2270	. 2857	. 3482	. 4053
Class 4, pitch diam—Min	------	------	------	------	------	------	------	------	------	------	. 2259	. 2845	. 3470	. 4040
Class 4, pitch diam—Tol	------	------	------	------	------	------	------	------	------	------	. 0011	. 0012	. 0012	. 0013

Nuts and Tapped Holes															
Classes 1, 2, 3, and 4, major diam	Min.[2]	.0600	.0730	.0860	.0990	.1120	.1250	.1380	.1640	.1900	.2160	.2500	.3125	.3750	.4375
Classes 1, 2, 3, and 4, minor diam	Max.[3]	.0514	.0634	.0746	.0856	.0960	.1068	.1179	.1402	.1624	.1835	.2173	.2739	.3364	.3906
	Min	.0465	.0580	.0691	.0797	.0894	.1004	.1109	.1339	.1562	.1773	.2113	.2674	.3299	.3834
	Tol	.0049	.0054	.0055	.0059	.0066	.0064	.0070	.0063	.0062	.0062	.0060	.0065	.0065	.0072
Classes 1, 2, 3, and 4, pitch diam	Min	.0519	.0640	.0759	.0874	.0985	.1102	.1218	.1460	.1697	.1928	.2268	.2854	.3479	.4050
Class 1, pitch diam	Max.[4]	.0543	.0665	.0785	.0902	.1016	.1134	.1252	.1496	.1735	.1971	.2311	.2900	.3525	.4101
	Tol	.0024	.0025	.0026	.0028	.0031	.0032	.0034	.0036	.0038	.0043	.0043	.0046	.0046	.0051
Class 2, pitch diam	Max.[4]	.0536	.0658	.0778	.0894	.1007	.1125	.1242	.1485	.1724	.1959	.2299	.2887	.3512	.3086
	Tol	.0017	.0018	.0019	.0020	.0022	.0023	.0024	.0025	.0027	.0031	.0031	.0033	.0033	.0036
Class 3, pitch diam	Max.[4]	.0532	.0653	.0773	.0889	.1001	.1118	.1235	.1478	.1716	.1950	.2290	.2878	.3503	.4076
	Tol	.0013	.0013	.0014	.0015	.0016	.0016	.0017	.0018	.0019	.0022	.0022	.0024	.0024	.0026
Class 4, pitch diam	Max.[4]	------	------	------	------	------	------	------	------	------	------	.2279	.2866	.3491	.4063
	Tol	------	------	------	------	------	------	------	------	------	------	.0011	.0012	.0012	.0013

See footnotes at end of table.

TABLE 16.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National fine-thread series*—Continued

Dimensions and tolerances	Size									
	½	9/16	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½
	Threads per inch									
	20	18	18	16	14	14	12	12	12	12
BOLTS AND SCREWS	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inches*	*Inches*	*Inches*	*Inches*
Class 1, major diam. Max.	0. 4985	0. 5609	0. 6234	0. 7482	0. 8729	0. 9979	1. 1226	1. 2476	1. 3726	1. 4976
Class 1, major diam. Min.	. 4883	. 5495	. 6120	. 7356	. 8589	. 9839	1. 1068	1. 2318	1. 3568	1. 4818
Class 1, major diam. Tol.	. 0102	. 0114	. 0114	. 0126	. 0140	. 0140	0. 0158	0. 0158	0. 0158	0. 0158
Classes 2, 3, and 4, major diam. Max.	. 5000	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500	1. 3750	1. 5000
Classes 2, 3, and 4, major diam. Min.	. 4928	. 5543	. 6168	. 7410	. 8652	0. 9902	1. 1138	1. 2388	1. 3638	1. 4888
Classes 2, 3, and 4, major diam. Tol.	. 0072	. 0082	. 0082	. 0090	. 0098	. 0098	0. 0112	0. 0112	0. 0112	0. 0112
Class 1, minor diam. Max.[1]	. 4372	. 4927	. 5552	. 6715	. 7853	. 9103	1. 0204	1. 1454	1. 2704	1. 3954
Classes 2, 3, and 4, minor diam. Max.[1]	. 4387	. 4943	. 5568	. 6733	. 7874	. 9124	1. 0228	1. 1478	1. 2728	1. 3978
Class 1, pitch diam. Max.	. 4660	. 5248	. 5873	. 7076	. 8265	. 9515	1. 0685	1. 1935	1. 3185	1. 4435
Class 1, pitch diam. Min.	. 4609	. 5191	. 5816	. 7013	. 8195	. 9445	1. 0606	1. 1856	1. 3106	1. 4356
Class 1, pitch diam. Tol.	. 0051	. 0057	. 0057	. 0063	. 0070	. 0070	0. 0079	0. 0079	0. 0079	0. 0079
Class 2, pitch diam. Max.	. 4675	. 5264	. 5889	. 7094	. 8286	. 9536	1. 0709	1. 1959	1. 3209	1. 4459
Class 2, pitch diam. Min.	. 4639	. 5223	. 5848	. 7049	. 8237	. 9487	1. 0653	1. 1903	1. 3153	1. 4403
Class 2, pitch diam. Tol.	. 0036	. 0041	. 0041	. 0045	. 0049	. 0049	0. 0056	0. 0056	0. 0056	0. 0056
Class 3, pitch diam. Max.	. 4675	. 5264	. 5889	. 7094	. 8286	. 9536	1. 0709	1. 1959	1. 3209	1. 4459
Class 3, pitch diam. Min.	4649	. 5234	. 5859	. 7062	. 8250	. 9500	1. 0669	1. 1919	1. 3169	1. 4419
Class 3, pitch diam. Tol.	. 0026	. 0030	. 0030	. 0032	. 0036	. 0036	0. 0040	0. 0040	0. 0040	0. 0040
Class 4, pitch diam. Max.	. 4678	. 5267	. 5892	. 7098	. 8290	. 9540	1. 0714	1. 1964	1. 3214	1. 4464
Class 4, pitch diam. Min.	. 4665	. 5252	. 5877	. 7082	. 8272	. 9522	1. 0694	1. 1944	1. 3194	1. 4444
Class 4, pitch diam. Tol.	. 0013	. 0015	. 0015	. 0016	. 0018	. 0018	0. 0020	0. 0020	0. 0020	0. 0020

500943°—43——4

NUTS AND TAPPED HOLES

Classes 1, 2, 3, and 4, major diam	Min.[2]	.5000	.5625	.6250	.7500	.8750	1.0000	1.1250	1.2500	1.3750	1.5000
Classes 1, 2, 3, and 4, minor diam	Max.[3]	.4531	.5100	.5725	.6903	.8062	0.9312	1.0438	1.1688	1.2938	1.4188
	Min	.4459	.5024	.5649	.6823	.7977	.9227	1.0348	1.1598	1.2848	1.4098
	Tol	.0072	.0076	.0076	.0080	.0085	.0085	0.0090	0.0090	0.0090	0.0090
Classes 1, 2, 3, and 4, pitch diam	Min	.4675	.5264	.5889	.7094	.8286	.9536	1.0709	1.1959	1.3209	1.4459
Class 1, pitch diam	Max[4]	.4726	.5321	.5946	.7157	.8356	.9606	1.0788	1.2038	1.3288	1.4538
	Tol	.0051	.0057	.0057	.0063	.0070	.0070	0.0079	0.0079	0.0079	0.0079
Class 2, pitch diam	Max.[4]	.4711	5.305	.5930	.7139	.8335	.9585	1.0765	1.2015	1.3265	1.4515
	Tol	.0036	.0041	.0041	.0045	.0049	.0049	0.0056	0.0056	0.0056	0.0056
Class 3, pitch diam	Max.[4]	.4701	.5294	.5919	.7126	.8322	.9572	1.0749	1.1999	1.3249	1.4499
	Tol	.0026	.0030	.0030	.0032	.0036	.0036	0.0040	0.0040	.0040	0.0040
Class 4 pitch diam	Max.[4]	.4688	.5279	.5904	.7110	.8304	.9554	1.0729	1.1979	1.3229	1.4479
	Tol	.0013	.0015	.0015	.0016	.0018	.0018	0.0020	0.0020	0.0020	0.0020

[1] Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to $\frac{1}{8}\times p$, and may be determined by subtracting the basic thread depth, h (or 0.6495 p), from the minimum pitch diameter of the screw.

[2] Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8}\times p$) and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to $\frac{1}{4}\times p$, and may be determined by adding $1\frac{1}{8}\times h$ (or 0.7939 p) to the maximum pitch diameter of the nut.

[3] Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

[4] These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

UNIFORM-PITCH SCREW-THREAD SERIES FOR HIGH-PRESSURE FASTENINGS, BOILER APPLICATIONS, MACHINERY COMPONENTS, ETC.[3]

FORM OF THREAD

9. The American National form of thread profile as specified in paragraphs 7 to 7f shall be used.

THREAD SERIES

9a. Where special threads are required, it is sometimes essential to select a certain pitch as standard for a range of sizes. Also, in general practice, where the pitch of a special thread is optional, the uniform use of a selected pitch is advantageous. For such applications 8, 12, and 16 threads per inch are widely used.

AMERICAN NATIONAL 8-PITCH-THREAD SERIES

9b. In table 26 are specified the nominal sizes and basic dimensions of the "American National 8-pitch-thread series." Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 29.

Bolts for high-pressure pipe flanges, cylinder-head studs, and similar fastenings against pressure require that an initial tension be set up in the fastening, by elastic deformation of the fastening and the components held together, such that the joint will not open up when the steam or other pressure is applied. To secure a proper initial tension it is not practicable that the pitch should increase with the diameter of the thread, as the torque required to assemble the fastening would be excessive. Accordingly, for such purposes the 8-pitch thread has come into general use.

AMERICAN NATIONAL 12-PITCH-THREAD SERIES

9c. The nominal sizes and basic dimensions of the "American National 12-pitch-thread series" are specified in table 27. Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 30.

Sizes of 12-pitch threads from one-half inch to and including one and three-fourths inches are used in boiler practice, which requires that worn stud holes be retapped with a tap of the next larger size, the increment being one-sixteenth inch throughout most of the range. Die-head chasers for sizes up to 3 inches are stocked by manufacturers.[4]

The 12-pitch threads are also widely used in machine construction, as for thin nuts on shafts and sleeves. From the standpoints of good design and simplification of practice, it is desirable to limit shoulder diameters to ⅛-inch steps. The 12 pitch is the coarsest in general use that will permit a threaded collar which screws onto a threaded shoulder to slip over a shaft, the difference in diameter between shoulder and shaft being one-eighth inch.

[3] This standard, in substantially the same form, has been adopted by the American Standards Association. It is published as ASA B1.1—1935 "Screw Threads" by the ASME, 29 West 39th St., New York, N. Y.

[4] See U. S. Department of Commerce Simplified Practice Recommendation R51–29, Die Head Chasers.

AMERICAN NATIONAL 16-PITCH-THREAD SERIES

9d. The nominal sizes and basic dimensions of the "American National 16-pitch-thread series" are specified in table 28. Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 31.

The 16-pitch series is a uniform pitch series for such applications as require a relatively fine thread. It is intended primarily for use on threaded adjusting collars and bearing-retaining nuts.

TABLE 26.—*American National 8-pitch thread series*

[Pitch, p=0.12500 inch; depth of thread, h=0.08119 inch; basic width of flat, $p/8$=0.01562 inch; minimum width of flat at major diameter of nut, $p/24$=0.00521 inch.]

Identification		Basic diameters			Thread data		
Sizes	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Helix angle at basic pitch diameter, s	Basic area of section at root of thread, $\frac{\pi K^2}{4}$
Inches		*Inches*	*Inches*	*Inches*	*mm*	*deg min*	*Square inches*
1 [1]	8	1.0000	0.9188	0.8376	25.400	2 29	0.5510
1⅛	8	1.1250	1.0438	.9626	28.575	2 11	.7277
1¼	8	1.2500	1.1688	1.0876	31.750	1 57	.9290
1⅜	8	1.3750	1.2938	1.2126	34.925	1 46	1.1548
1½	8	1.5000	1.4188	1.3376	38.100	1 36	1.4052
1⅝	8	1.6250	1.5438	1.4626	41.275	1 29	1.6801
1¾	8	1.7500	1.6688	1.5876	44.450	1 22	1.9796
1⅞	8	1.8750	1.7938	1.7126	47.625	1 16	2.3036
2	8	2.0000	1.9188	1.8376	50.800	1 11	2.6521
2⅛	8	2.1250	2.0438	1.9626	53.975	1 7	3.0252
2¼	8	2.2500	2.1688	2.0876	57.150	1 3	3.4228
2½	8	2.5000	2.4188	2.3376	63.500	0 57	4.2917
2¾	8	2.7500	2.6688	2.5876	69.850	0 51	5.2588
3	8	3.0000	2.9188	2.8376	76.200	0 47	6.3240
3¼	8	3.2500	3.1688	3.0876	82.550	0 43	7.4874
3½	8	3.5000	3.4188	3.3376	88.900	0 40	8.7490
3¾	8	3.7500	3.6688	3.5876	95.250	0 37	10.1088
4	8	4.0000	3.9188	3.8376	101.600	0 35	11.5667
4¼	8	4.2500	4.1688	4.0876	107.950	0 33	13.1228
4½	8	4.5000	4.4188	4.3376	114.300	0 31	14.7771
4¾	8	4.7500	4.6688	4.5876	120.650	0 29	16.5295
5	8	5.0000	4.9188	4.8376	127.000	0 28	18.3802
5¼	8	5.2500	5.1688	5.0876	133.350	0 26	20.3290
5½	8	5.5000	5.4188	5.3376	139.700	0 25	22.3760
5¾	8	5.7500	5.6688	5.5876	146.050	0 24	24.5211
6	8	6.0000	5.9188	5.8376	152.400	0 23	26.7645

[1] Standard size of the American National coarse-thread series.

TABLE 27.—*American National 12-pitch thread series*

[Pitch, $p=0.08333$ inch; depth of thread, $h=0.05413$ inch; basic width of flat, $p/8=0.01042$ inch; minimum width of flat at major diameter of nut, $p/24=0.00347$ inch.]

Identification		Basic diameters			Thread data		
Sizes	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Helix angle at basic pitch diameter, s	Basic area of section at root of thread, $\frac{\pi K^2}{4}$
Inches		*Inches*	*Inches*	*Inches*	*mm*	*deg min*	*Square inches*
1/2	12	0.5000	0.4459	0.3917	12.700	3 24	0.1205
9/16 [1]	12	.5625	.5084	.4542	14.288	2 59	.1620
5/8	12	.6250	.5709	.5167	15.875	2 40	.2097
11/16	12	.6875	.6334	.5792	17.463	2 24	.2635
3/4	12	.7500	.6959	.6417	19.050	2 11	.3234
13/16	12	.8125	.7584	.7042	20.638	2 0	.3895
7/8	12	.8750	.8209	.7667	22.225	1 51	.4617
15/16	12	.9375	.8834	.8292	23.813	1 43	.5400
1	12	1.0000	.9459	.8917	25.400	1 36	.6245
1 1/16	12	1.0625	1.0084	.9542	26.988	1 30	.7151
1 1/8 [2]	12	1.1250	1.0709	1.0167	28.575	1 25	.8118
1 3/16	12	1.1875	1.1334	1.0792	30.163	1 20	.9147
1 1/4 [2]	12	1.2500	1.1959	1.1417	31.750	1 16	1.0237
1 5/16	12	1.3125	1.2584	1.2042	33.338	1 12	1.1389
1 3/8 [2]	12	1.3750	1.3209	1.2667	34.925	1 9	1.2602
1 7/16	12	1.4375	1.3834	1.3292	36.513	1 6	1.3876
1 1/2 [2]	12	1.5000	1.4459	1.3917	38.100	1 3	1.5212
1 5/8	12	1.6250	1.5709	1.5167	41.275	0 58	1.8067
1 3/4	12	1.7500	1.6959	1.6417	44.450	0 54	2.1168
1 1/8	12	1.8750	1.8209	1.7667	47.625	0 50	2.4514
2	12	2.0000	1.9459	1.8917	50.800	0 47	2.8106
2 1/8	12	2.1250	2.0709	2.0167	53.975	0 44	3.1943
2 1/4	12	2.2500	2.1959	2.1417	57.150	0 42	3.6025
2 3/8	12	2.3750	2.3209	2.2667	60.325	0 39	4.0353
2 1/2	12	2.5000	2.4459	2.3917	63.500	0 37	4.4927
2 5/8	12	2.6250	2.5709	2.5167	66.675	0 35	4.9745
2 3/4	12	2.7500	2.6959	2.6417	69.850	0 34	5.4810
2 7/8	12	2.8750	2.8209	2.7667	73.025	0 32	6.0119
3	12	3.0000	2.9459	2.8917	76.200	0 31	6.5674
3 1/8	12	3.1250	3.0709	3.0167	79.375	0 30	7.1475
3 1/4	12	3.2500	3.1959	3.1417	82.550	0 29	7.7521
3 3/8	12	3.3750	3.3209	3.2667	85.725	0 27	8.3812
3 1/2	12	3.5000	3.4459	3.3917	88.900	0 26	9.0349
3 5/8	12	3.6250	3.5709	3.5167	92.075	0 26	9.7132
3 3/4	12	3.7500	3.6959	3.6417	95.250	0 25	10.4159
3 7/8	12	3.8750	3.8209	3.7667	98.425	0 24	11.1433
4	12	4.0000	3.9459	3.8917	101.600	0 23	11.8951
4 1/4	12	4.2500	4.1959	4.1417	107.950	0 22	13.4725
4 1/2	12	4.5000	4.4459	4.3917	114.300	0 21	15.1480
4 3/4	12	4.7500	4.6959	4.6417	120.650	0 19	16.9217
5	12	5.0000	4.9459	4.8917	127.000	0 18	18.7936
5 1/4	12	5.2500	5.1959	5.1417	133.350	0 18	20.7636
5 1/2	12	5.5000	5.4459	5.3917	139.700	0 17	22.8319
5 3/4	12	5.7500	5.6959	5.6417	146.050	0 16	24.9983
6	12	6.0000	5.9459	5.8917	152.400	0 15	27.2628

[1] Standard size of the American National coarse-thread series.
[2] Standard size of the American National fine-thread series.

TABLE 28.—*American National 16-pitch thread series*

[Pitch, p=0.06250 inch; depth of thread, h=0.04059 inch; basic width of flat, $p/8$=0.00781 inch; minimum width of flat at major diameter of nut, $p/24$=0.00260 inch]

Identification		Basic diameters			Thread data			
Sizes	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Helix angle at basic pitch diameter, s		Basic area of section at root of thread, $\frac{\pi K^2}{4}$
Inches		*Inches*	*Inches*	*Inches*	*mm*	*deg*	*min*	*Square inches*
¾ [1]	16	0.7500	0.7094	0.6688	19.050	1	36	0.3513
13/16	16	.8125	.7719	.7313	20.638	1	29	.4200
⅞	16	.8750	.8344	.7938	22.225	1	22	.4949
15/16	16	.9375	.8969	.8563	23.813	1	16	.5759
1	16	1.0000	.9594	.9188	25.400	1	11	.6630
1 1/16	16	1.0625	1.0219	.9813	26.988	1	7	.7563
1⅛	16	1.1250	1.0844	1.0438	28.575	1	3	.8557
1 3/16	16	1.1875	1.1469	1.1063	30.163	1	0	.9612
1¼	16	1.2500	1.2094	1.1688	31.750	0	57	1.0729
1 5/16	16	1.3125	1.2719	1.2313	33.338	0	54	1.1907
1⅜	16	1.3750	1.3344	1.2938	34.925	0	51	1.3147
1 7/16	16	1.4375	1.3969	1.3563	36.513	0	49	1.4448
1½	16	1.5000	1.4594	1.4188	38.100	0	47	1.5810
1 9/16	16	1.5625	1.5219	1.4183	39.688	0	45	1.7234
1⅝	16	1.6250	1.5844	1.5438	41.275	0	43	1.8719
1 11/16	16	1.6875	1.6469	1.6063	42.863	0	42	2.0265
1¾	16	1.7500	1.7094	1.6688	44.450	0	40	2.1873
1 13/16	16	1.8125	1.7719	1.7313	46.038	0	39	2.3542
1⅞	16	1.8750	1.8344	1.7938	47.625	0	37	2.5272
1 15/16	16	1.9375	1.8969	1.8563	49.213	0	36	2.7064
2	16	2.0000	1.9594	1.9188	50.800	0	35	2.8917
2 1/16	16	2.0625	2.0219	1.9813	52.388	0	34	3.0831
2⅛	16	2.1250	2.0844	2.0438	53.975	0	33	3.2807
2 3/16	16	2.1875	2.1469	2.1063	55.563	0	32	3.4844
2¼	16	2.2500	2.2094	2.1688	57.150	0	31	3.6943
2 5/16	16	2.3125	2.2719	2.2313	58.738	0	30	3.9103
2⅜	16	2.3750	2.3344	2.2938	60.325	0	29	4.1324
2 7/16	16	2.4375	2.3969	2.3563	61.913	0	29	4.3606
2½	16	2.5000	2.4594	2.4188	63.500	0	28	4.5950
2⅝	16	2.6250	2.5844	2.5438	66.675	0	26	5.0822
2¾	16	2.7500	2.7094	2.6688	69.850	0	25	5.5940
2⅞	16	2.8750	2.8344	2.7938	73.025	0	24	6.1303
3	16	3.0000	2.9594	2.9188	76.200	0	23	6.6911
3⅛	16	3.1250	3.0844	3.0438	79.375	0	22	7.2765
3¼	16	3.2500	3.2094	3.1688	82.550	0	21	7.8864
3⅜	16	3.3750	3.3344	3.2938	85.725	0	21	8.5209
3½	16	3.5000	3.4594	3.4188	88.900	0	20	9.1799
3⅝	16	3.6250	3.5844	3.5438	92.075	0	19	9.8634
3¾	16	3.7500	3.7094	3.6688	95.250	0	18	10.5715
3⅞	16	3.8750	3.8344	3.7938	98.425	0	18	11.3042
4	16	4.0000	3.9594	3.9188	101.600	0	17	12.0614

[1] Standard size of the American National fine-thread series.

TABLE 29.—*Limiting dimensions and tolerances, classes 2 and 3 fits, American National 8-pitch thread series*

Dimensions and tolerances [1]	Size (inches)												
	1 [2]	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2½	2¾
BOLTS AND SCREWS	*Inch*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Classes 2 and 3, major diameter— Max	1. 0000	1. 1250	1. 2500	1. 3750	1. 5000	1. 6250	1. 7500	1. 8750	2. 0000	2. 1250	2. 2500	2. 5000	2. 7500
Min	0. 9848	1. 1098	1. 2348	1. 3598	1. 4848	1. 6098	1. 7348	1. 8598	1. 9848	2. 1098	2. 2348	2. 4848	2. 7348
Tol	. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152
Classes 2 and 3, minor diameter— Max.[3]	. 8466	. 9716	1. 0966	1. 2216	1. 3466	1. 4716	1. 5966	1. 7216	1. 8466	1. 9716	2. 0966	2. 3466	2. 5966
Class 2, pitch diameter (for general use)— Max	. 9188	1. 0438	1. 1688	1. 2938	1. 4188	1. 5438	1. 6688	1. 7938	1. 9188	2. 0438	2. 1688	2. 4188	2. 6688
Min	. 9112	1. 0359	1. 1605	1. 2852	1. 4098	1. 5345	1. 6591	1. 7838	1. 9084	2. 0331	2. 1578	2. 4071	2. 6564
Tol	. 0076	0, 0079	0. 0083	0. 0086	0. 0090	0. 0093	0. 0097	0. 0100	0. 0104	0. 0107	0. 0110	0. 0117	0. 0124
Class 3, pitch diameter— Max	. 9188	1. 0438	1. 1688	1. 2938	1. 4188	1. 5438	1. 6688	1. 7938	1. 9188	2. 0438	2. 1688	2. 4188	2. 6688
Min	. 9134	1. 0383	1. 1630	1. 2877	1. 4125	1. 5373	1. 6620	1. 7868	1. 9115	2. 0363	2. 1611	2. 4106	2. 6601
Tol	. 0054	0. 0055	0. 0058	0. 0061	0. 0063	0. 0065	0. 0068	0. 0070	0. 0073	0. 0075	0. 0077	0. 0082	0. 0087
NUTS AND TAPPED HOLES													
Classes 2 and 3, major diameter— Min.[4]	1. 0000	1. 1250	1. 2500	1. 3750	1. 5000	1. 6250	1. 7500	1. 8750	2. 0000	2. 1250	2. 2500	2. 5000	2. 7500
Classes 2 and 3, minor diameter— Min	0. 8647	0. 9897	1. 1147	1. 2397	1. 3647	1. 4897	1. 6147	1. 7397	1. 8647	1. 9897	2. 1147	2. 3647	2. 6147
Max.[5]	. 8795	1. 0045	1. 1295	1. 2545	1. 3795	1. 5045	1. 6295	1. 7545	1. 8795	2. 0045	2. 1295	2. 3795	2. 6295
Tol	. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148
Classes 2 and 3, pitch diameter— Min	. 9188	1. 0438	1. 1688	1. 2938	1. 4188	1. 5438	1. 6688	1. 7938	1. 9188	2. 0438	2. 1688	2. 4188	2. 6688
Class 2, pitch diameter (for general use)— Max.[6]	. 9264	1. 0517	1. 1771	1. 3024	1. 4278	1. 5531	1. 6785	1. 8038	1. 9292	2. 0545	2. 1798	2. 4305	2. 6812
Tol	. 0076	0. 0079	0. 0083	0. 0086	0. 0090	0. 0093	0. 0097	0. 0100	0. 0104	0. 0107	0. 0110	0. 0117	0. 0124
Class 3, pitch diameter— Max.[6]	. 9242	1. 0493	1. 1746	1. 2999	1. 4251	1. 5503	1. 6756	1. 8008	1. 9261	2. 0513	2. 1765	2. 4270	2. 6775
Tol	. 0054	0. 0055	0. 0058	0. 0061	0. 0063	0. 0065	0. 0068	0. 0070	0. 0073	0. 0075	0. 0077	0. 0082	0. 0087

Dimensions and tolerances [1]		Size (inches)												
		3	3¼	3½	3¾	4	4¼	4½	4¾	5	5¼	5½	5¾	6
Bolts and Screws														
Classes 2 and 3, major diameter	Max	3. 0000	3. 2500	3. 5000	3. 7500	4. 0000	4. 2500	4. 5000	4. 7500	5. 0000	5. 2500	5. 5000	5. 7500	6. 0000
	Min	2. 9848	3. 2348	3. 4848	3. 7348	3. 9848	4. 2348	4. 4848	4. 7348	4. 9848	5. 2348	5. 4848	5. 7348	5. 9848
	Tol	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152	0. 0152
Classes 2 and 3, minor diameter	Max.[3]	2. 8466	3. 0966	3. 3466	3. 5966	3. 8466	4. 0966	4. 3466	4. 5966	4. 8466	5. 0966	5. 3466	5. 5966	5. 8466
Class 2, pitch diameter (for general use)	Max	2. 9188	3. 1688	3. 4188	3. 6688	3. 9188	4. 1688	4. 4188	4. 6688	4. 9188	5. 1688	5. 4188	5. 6688	5. 9188
	Min	2. 9058	3. 1556	3. 4055	3. 6554	3. 9053	4. 1551	4. 4050	4. 6549	4. 9048	5. 1547	5. 4046	5. 6545	5. 9044
	Tol	0. 0130	0. 0132	0. 0133	0. 0134	0. 0135	0. 0137	0. 0138	0. 0139	0. 0140	0. 0141	0. 0142	0. 0143	0. 0144
Class 3, pitch diameter	Max	2. 9188	3. 1688	3. 4188	3. 6688	3. 9188	4. 1688	4. 4188	4. 6688	4. 9188	5. 1688	5. 4188	5. 6688	5. 9188
	Min	2. 9096	3. 1595	3. 4095	3. 6594	3. 9093	4. 1592	4. 4091	4. 6590	4. 9089	5. 1589	5. 4088	5. 6587	5. 9086
	Tol	0. 0092	0. 0093	0. 0093	0. 0094	0. 0095	0. 0096	0. 0097	0. 0098	0. 0099	0. 0099	0. 0100	0. 0101	0. 0102
Nuts and Tapped Holes														
Classes 2 and 3, major diameter	Min.[4]	3. 0000	3. 2500	3. 5000	3. 7500	4. 0000	4. 2500	4. 5000	4. 7500	5. 0000	5. 2500	5. 5000	5. 7500	6. 0000
Classes 2 and 3, minor diameter	Min	2. 8647	3. 1147	3. 3647	3. 6147	3. 8647	4. 1147	4. 3647	4. 6147	4. 8647	5. 1147	5. 3647	5. 6147	5. 8647
	Max.[5]	2. 8795	3. 1295	3. 3795	3. 6295	3. 8795	4. 1295	4. 3795	4. 6295	4. 8795	5. 1295	5. 3795	5. 6295	5. 8795
	Tol	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148	0. 0148
Classes 2 and 3, pitch diameter	Min	2. 9188	3. 1688	3. 4188	3. 6688	3. 9188	4. 1688	4. 4188	4. 6688	4. 9188	5. 1688	5. 4188	5. 6688	5. 9188
Class 2, pitch diameter (for general use)	Max.[6]	2. 9318	3. 1820	3. 4321	3. 6822	3. 9323	4. 1825	4. 4326	4. 6827	4. 9328	5. 1829	5. 4330	5. 6831	5. 9332
	Tol	0. 0130	0. 0132	0. 0133	0. 0134	0. 0135	0. 0137	0. 0138	0. 0139	0. 0140	0. 0141	0. 0142	0. 0143	0. 0144
Class 3, pitch diameter	Max.[6]	2. 9280	3. 1781	3. 4281	3. 6782	3. 9283	4. 1784	4. 4285	4. 6786	4. 9287	5. 1787	5. 4288	5. 6789	5. 9290
	Tol	0. 0092	0. 0093	0. 0093	0. 0094	0. 0095	0. 0096	0. 0097	0. 0098	0. 0099	0. 0099	0. 0100	0. 0101	0. 0102

[1] Pitch diameter tolerances include errors of lead and angle. The class 2 tolerances are based on the formulas in table 116 and a length of engagement equal to the basic major diameter for sizes from 1⅛ to 3 inches, inclusive, and a length of engagement of 3 inches for sizes over the 3-inch. The class 3 tolerances are 70 percent of the class 2 tolerances. The 1-inch size being in the American National coarse-thread series, the tolerances for this size correspond to that series.

[2] Standard size screw and nut of the American National coarse-thread series.

[3] Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to $\frac{1}{8} \times p$, and may be determined by subtracting 0.0812 inch from the minimum pitch diameter of the screw.

[4] Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8} \times p$), and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to $\frac{1}{4} \times p$, and may be determined by adding 0.0992 inch to the maximum pitch diameter of the nut.

[5] Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

[6] These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

TABLE 30.—*Limiting dimensions and tolerances, classes 2 and 3 fits, American National 12-pitch thread series*

Dimensions and tolerances [1]	Size (inches)														
	½	9/16 [2]	⅝	11/16	¾	13/16	⅞	15/16	1	1 1/16	1 1/8 [3]	1 3/16	1 1/4 [3]	1 5/16	1 3/8 [3]
BOLTS AND SCREWS	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Classes 2 and 3, major diam. Max.	0. 5000	0. 5625	0. 6250	0. 6875	0. 7500	0. 8125	0. 8750	0. 9375	1. 0000	1. 0625	1. 1250	1. 1875	1. 2500	1. 3125	1. 3750
Classes 2 and 3, major diam. Min.	. 4888	. 5513	. 6138	. 6763	. 7388	. 8013	. 8638	. 9263	0. 9888	1. 0513	1. 1138	1. 1763	1. 2388	1. 3013	1. 3638
Classes 2 and 3, major diam. Tol.	. 0112	. 0112	. 0112	. 0112	. 0112	. 0112	. 0112	0. 0112	. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112
Classes 2 and 3, minor diam. Max. [4]	. 3978	. 4603	. 5228	. 5853	. 6478	. 7103	. 7728	. 8353	. 8978	. 9603	1. 0228	1. 0853	1. 1478	1. 2103	1. 2728
Class 2, pitch diam. (for general use) Max.	. 4459	. 5084	. 5709	. 6334	. 6959	. 7584	. 8209	. 8834	. 9459	1. 0084	1. 0709	1. 1334	1. 1959	1. 2584	1. 3209
Class 2, pitch diam. (for general use) Min.	. 4403	. 5028	. 5653	. 6278	. 6903	. 7528	. 8153	. 8778	. 9403	1. 0028	1. 0653	1. 1278	1. 1903	1. 2528	1. 3153
Class 2, pitch diam. (for general use) Tol.	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	0. 0056	0. 0056	0. 0056	0. 0056	0. 0056	0. 0056
Class 3, pitch diam. Max.	. 4459	. 5084	. 5709	. 6334	. 6959	. 7584	. 8209	. 8834	. 9459	1. 0084	1. 0709	1. 1334	1. 1959	1. 2584	1. 3209
Class 3, pitch diam. Min.	. 4419	. 5044	. 5669	. 6294	. 6919	. 7544	. 8169	. 8794	. 9419	1. 0044	1. 0669	1. 1294	1. 1919	1. 2544	1. 3169
Class 3, pitch diam. Tol.	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	0. 0040	0. 0040	0. 0040	0. 0040	0. 0040	0. 0040
NUTS AND TAPPED HOLES															
Classes 2 and 3, major diam. Min. [5]	. 5000	. 5625	. 6250	. 6875	. 7500	. 8125	. 8750	. 9375	1. 0000	1. 0625	1. 1250	1. 1875	1. 2500	1. 3125	1. 3750
Classes 2 and 3, minor diam. Min.	. 4098	. 4723	. 5348	. 5973	. 6598	. 7223	. 7848	. 8473	0. 9098	0. 9723	1. 0348	1. 0973	1. 1598	1. 2223	1. 2848
Classes 2 and 3, minor diam. Max.	. 4225	. 4850	. 5438	. 6063	. 6688	. 7313	. 7938	. 8563	. 9188	. 9813	1. 0438	1. 1063	1. 1688	1. 2313	1. 2938
Classes 2 and 3, minor diam. Tol.	. 0127	. 0127	. 0090	. 0090	. 0090	. 0090	. 0090	. 0090	. 0090	. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Classes 2 and 3, pitch diam. Min.	. 4459	. 5084	. 5709	. 6334	. 6959	. 7584	. 8209	. 8834	. 9459	1. 0084	1. 0709	1. 1334	1. 1959	1. 2584	1. 3209
Class 2, pitch diam. (for general use) Max. [6]	. 4515	. 5140	. 5765	. 6390	. 7015	. 7640	. 8265	. 8890	. 9515	1. 0140	1. 0765	1. 1390	1. 2015	1. 2640	1. 3265
Class 2, pitch diam. (for general use) Tol.	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	. 0056	0. 0056	0. 0056	0. 0056	0. 0056	0. 0056	0. 0056
Class 3, pitch diam. Max. [6]	. 4499	. 5124	. 5749	. 6374	. 6999	. 7624	. 8249	. 8874	. 9499	1. 0124	1. 0749	1. 1374	1. 1999	1. 2624	1. 3249
Class 3, pitch diam. Tol.	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	. 0040	0. 0040	0. 0040	0. 0040	0. 0040	0. 0040	0. 0040

Dimensions and tolerances [1]	Size (inches)														
	1 1/16	1 1/8 [3]	1 3/16	1 1/4	1 3/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8	2 3/4	2 7/8	3	3 1/8
Bolts and Screws	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Classes 2 and 3, major diam. Max.	1. 4375	1. 5000	1. 6250	1. 7500	1. 8750	2. 0000	2. 1250	2. 2500	2. 3750	2. 5000	2. 6250	2. 7500	2. 8750	3. 0000	3. 1250
Classes 2 and 3, major diam. Min.	1. 4263	1. 4888	1. 6138	1. 7388	1. 8638	1. 9888	2. 1138	2. 2388	2. 3638	2. 4888	2. 6138	2. 7388	2. 8638	2. 9888	3. 1138
Classes 2 and 3, major diam. Tol.	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112
Classes 2 and 3, minor diam. Max. [4]	1. 3353	1. 3978	1. 5228	1. 6478	1. 7728	1. 8978	2. 0228	2. 1478	2. 2728	2. 3978	2. 5228	2. 6478	2. 7728	2. 8978	3. 0228
Class 2, pitch diam. (for general use) Max.	1. 3834	1. 4459	1. 5709	1. 6959	1. 8209	1. 9459	2. 0709	2. 1959	2. 3209	2. 4459	2. 5709	2. 6959	2. 8209	2. 9459	3. 0709
Class 2, pitch diam. (for general use) Min.	1. 3778	1. 4403	1. 5645	1. 6894	1. 8143	1. 9392	2. 0641	2. 1890	2. 3139	2. 4388	2. 5638	2. 6887	2. 8136	2. 9385	3. 0635
Class 2, pitch diam. (for general use) Tol.	0. 0056	0. 0006	0. 0064	0. 0065	0. 0066	0. 0067	0. 0068	0. 0069	0. 0070	0. 0071	0. 0071	0. 0072	0. 0073	0. 0074	0. 0074
Class 3, pitch diam. Max.	1. 3834	1. 4459	1. 5709	1. 6959	1. 8209	1. 9459	2. 0709	2. 1959	2. 3209	2. 4459	2. 5709	2. 6959	2. 8209	2. 9459	3. 0709
Class 3, pitch diam. Min.	1. 3794	1. 4419	1. 5664	1. 6913	1. 8163	1. 9412	2. 0661	2. 1911	2. 3160	2. 4410	2. 5659	2. 6909	2. 8158	2. 9408	3. 0657
Class 3, pitch diam. Tol.	0. 0040	0. 0040	0. 0045	0. 0046	0. 0046	0. 0047	0. 0048	0. 0048	0. 0049	0. 0049	0. 0050	0. 0050	0. 0051	0. 0051	0. 0052
Nuts and Tapped Holes															
Classes 2 and 3, major diam. Min. [6]	1. 4375	1. 5000	1. 6250	1. 7500	1. 8750	2. 0000	2. 1250	2. 2500	2. 3750	2. 5000	2. 6250	2. 7500	2. 8750	3. 0000	3. 1250
Classes 2 and 3, minor diam. Min.	1. 3473	1. 4098	1. 5348	1. 6598	1. 7848	1. 9098	2. 0348	2. 1598	2. 2848	2. 4098	2. 5348	2. 6598	2. 7848	2. 9098	3. 0348
Classes 2 and 3, minor diam. Max.	1. 3563	1. 4188	1. 5438	1. 6688	1. 7938	1. 9188	2. 0438	2. 1688	2. 2938	2. 4188	2. 5438	2. 6688	2. 7938	2. 9188	3. 0438
Classes 2 and 3, minor diam. Tol.	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Classes 2 and 3, pitch diam. Min.	1. 3834	1. 4459	1. 5709	1. 6959	1. 8209	1. 9459	2. 0709	2. 1959	2. 3209	2. 4459	2. 5709	2. 6959	2. 8209	2. 9459	3. 0709
Class 2, pitch diam. (for general use) Max. [6]	1. 3890	1. 4515	1. 5773	1. 7024	1. 8275	1. 9526	2. 0777	2. 2028	2. 3279	2. 4530	2. 5780	2. 7031	2. 8282	2. 9533	3. 0783
Class 2, pitch diam. (for general use) Tol.	0. 0056	0. 0056	0. 0064	0. 0065	0. 0066	0. 0067	0. 0068	0. 0069	0. 0070	0. 0071	0. 0071	0. 0072	0. 0073	0. 0074	0. 0074
Class 3, pitch diam. Max. [6]	1. 3874	1. 4499	1. 5754	1. 7005	1. 8255	1. 9506	2. 0757	2. 2007	2. 3258	2. 4508	2. 5759	2. 7009	2. 8260	2. 9510	3. 0761
Class 3, pitch diam. Tol.	0. 0040	0. 0040	0. 0045	0. 0046	0. 0046	0. 0047	0. 0048	0. 0048	0. 0049	0. 0049	0. 0050	0. 0050	0. 0051	0. 0051	0. 0052

See footnotes at end of table.

500332°—43——5

TABLE 30.—*Limiting dimensions and tolerances, classes 2 and 3 fits, American National 12 pitch-thread series*—Continued

Dimensions and tolerances [1]		Size (inches)														
		3¼	3⅜	3½	3⅝	3¾	3⅞	4	4¼	4½	4¾	5	5¼	5½	5¾	6
BOLTS AND SCREWS		*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Classes 2 and 3, major diam	Max	3. 2500	3. 3750	3. 5000	3. 6250	3. 7500	3. 8750	4. 0000	4. 2500	4. 5000	4. 7500	5. 0000	5. 2500	5. 5000	5. 7500	6. 0000
	Min	3. 2388	3. 3638	3. 4888	3. 6138	3. 7388	3. 8638	3. 9888	4. 2388	4. 4888	4. 7388	4. 9888	5. 2388	5. 4888	5. 7388	5. 9888
	Tol	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112
Classes 2 and 3, minor diam	Max.[4]	3. 1478	3. 2728	3. 3978	3. 5228	3. 6478	3. 7728	3. 8978	4. 1478	4. 3978	4. 6478	4. 8978	5. 1478	5. 3978	5. 6478	5. 8978
Class 2, pitch diam (for general use)	Max	3. 1959	3. 3209	3. 4459	3. 5709	3. 6959	3. 8209	3. 9459	4. 1959	4. 4459	4. 6959	4. 9459	5. 1959	5. 4459	5. 6959	5. 9459
	Min	3. 1884	3. 3133	3. 4383	3. 5632	3. 6881	3. 8131	3. 9380	4. 1879	4. 4378	4. 6876	4. 9375	5. 1874	5. 4373	5. 6872	5. 9371
	Tol	0. 0075	0. 0076	0. 0076	0. 0077	0. 0078	0. 0078	0. 0079	0. 0080	0. 0081	0. 0083	0. 0084	0. 0085	0. 0086	0. 0087	0. 0088
Class 3, pitch diam	Max	3. 1959	3. 3209	3. 4459	3. 5709	3. 6959	3. 8209	3. 9459	4. 1959	4. 4459	4. 6959	4. 9459	5. 1959	5. 4459	5. 6959	5. 9459
	Min	3. 1907	3. 3156	3. 4406	3. 5655	3. 6905	3. 8154	3. 9404	4. 1903	4. 4402	4. 6901	4. 9400	5. 1900	5. 4399	5. 6898	5. 9397
	Tol	0. 0052	0. 0053	0. 0053	0. 0054	0. 0054	0. 0055	0. 0055	0. 0056	0. 0057	0. 0058	0. 0059	0. 0059	0. 0060	0. 0061	0. 0062

Nuts and Tapped Holes																	
Classes 2 and 3, major diam	Min.[5]	3. 2500	3. 3750	3. 5000	3. 6250	3. 7500	3. 8750	4. 0000	4. 2500	4. 5000	4. 7500	5. 0000	5. 2500	5. 5000	5. 7500	6. 0000
Class 2 and 3, minor diam	Min	3. 1598	3. 2848	3. 4098	3. 5348	3. 6598	3. 7848	3. 9098	4. 1598	4. 4098	4. 6598	4. 9098	5. 1598	5. 4098	5. 6598	5. 9098
	Max	3. 1688	3. 2938	3. 4188	3. 5438	3. 6688	3. 7938	3. 9188	4. 1688	4. 4188	4. 6688	4. 9188	5. 1688	5. 4188	5. 6688	5. 9188
	Tol	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Classes 2 and 3, pitch diam	Min	3. 1959	3. 3209	3. 4459	3. 5709	3. 6959	3. 8209	3. 9459	4. 1959	4. 4459	4. 6959	4. 9459	5. 1959	5. 4459	5. 6959	5. 9459
Class 2, pitch diam (for general use)	Max.[6]	3. 2034	3. 3285	3. 4535	3. 5786	3. 7037	3. 8287	3. 9538	4. 2039	4. 4540	4. 7042	4. 9543	5. 2044	5. 4545	5. 7046	5. 9547
	Tol	0. 0075	0. 0076	0. 0076	0. 0077	0. 0078	0. 0078	0. 0079	0. 0080	0. 0081	0. 0083	0. 0084	0. 0085	0. 0086	0. 0087	0. 0088
Class 3, pitch diam	Max.[6]	3. 2011	3. 3262	3. 4512	3. 5763	3. 7013	3. 8264	3. 9514	4. 2015	4. 4516	4. 7017	4. 9518	5. 2018	5. 4519	5. 7020	5. 9521
	Tol	0. 0052	0. 0053	0. 0053	0. 0054	0. 0054	0. 0055	0. 0055	0. 0056	0. 0057	0. 0058	0. 0059	0. 0059	0. 0060	0. 0061	0. 0062

[1] Pitch-diameter tolerances include errors of lead and angle. The class 2 tolerances for sizes above 1½ inches are based on the formulas in table 116 and a length of engagement of 6 threads or ½ inch. The class 3 tolerances are 70 percent of the class 2 tolerances. For lengths of engagement of 1 inch, 0.0010 inch may be added to these tolerances. As certain sizes up to 1½ inches are included in the American National coarse- or fine-thread series, the tolerances to and including 1½ inches correspond to those series.

[2] Standard-size screw and nut of the American National coarse-thread series.

[3] Standard-size screw and nut of the American National fine-thread series.

[4] Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to $\frac{1}{8} \times p$, and may be determined by subtracting 0.0541 inch from the minimum pitch diameter of the screw.

[5] Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8} \times p$) and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to $\frac{1}{24} \times p$, and may be determined by adding 0.0662 inch to the maximum pitch diameter of the nut.

[6] These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

TABLE 31.—*Limiting dimensions and tolerances, classes 2 and 3 fit, American National 16-pitch-thread series*

Dimensions and tolerances [1]		Size (inches)									
		¾ [2]	13/16	⅞	15/16	1	1 1/16	1 1/8	1 3/16	1 1/4	1 5/16
BOLTS AND SCREWS		*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Major diameter	Max	0.7500	0.8125	0.8750	0.9375	1.0000	1.0625	1.1250	1.1875	1.2500	1.3125
	Min	.7410	.8035	.8660	.9285	0.9910	1.0535	1.1160	1.1785	1.2410	1.3035
	Tol	.0090	.0090	.0090	.0090	.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Minor diameter	Max [3]	.6733	.7358	.7983	.8608	.9233	.9858	1.0483	1.1108	1.1733	1.2358
Class 2, pitch diameter (for general use)	Max	.7094	.7719	.8344	.8969	.9594	1.0219	1.0844	1.1469	1.2094	1.2719
	Min	.7049	.7668	.8293	.8917	.9542	1.0166	1.0790	1.1415	1.2039	1.2664
	Tol	.0045	.0051	.0051	.0052	.0052	0.0053	0.0054	0.0054	0.0055	0.0055
Class 3, pitch diameter	Max	.7094	.7719	.8344	.8969	.9594	1.0219	1.0844	1.1469	1.2094	1.2719
	Min	.7062	.7684	.8308	.8933	.9557	1.0182	1.0806	1.1431	1.2056	1.2680
	Tol	.0032	.0035	.0036	.0036	.0037	0.0037	0.0038	0.0038	0.0038	0.0039
NUTS AND TAPPED HOLES											
Major diameter	Min [4]	.7500	.8125	.8750	.9375	1.0000	1.0625	1.1250	1.1875	1.2500	1.3125
Minor diameter	Min	.6823	.7448	.8073	.8698	0.9323	0.9948	1.0573	1.1198	1.1823	1.2448
	Max [5]	.6903	.7528	.8153	.8778	.9403	1.0028	1.0653	1.1278	1.1903	1.2528
	Tol	.0080	.0080	.0080	.0080	.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Class 2, pitch diameter (for general use)	Min	.7094	.7719	.8344	.8969	.9594	1.0219	1.0844	1.1469	1.2094	1.2719
	Max	.7139	.7770	.8395	.9021	.9646	1.0272	1.0898	1.1523	1.2149	1.2774
	Tol	.0045	.0051	.0051	.0052	.0052	0.0053	0.0054	0.0054	0.0055	0.0055
Class 3, pitch diameter	Min	.7094	.7719	.8344	.8969	.9594	1.0219	1.0844	1.1469	1.2094	1.2719
	Max	.7126	.7754	.8380	.9005	.9631	1.0256	1.0882	1.1507	1.2132	1.2758
	Tol	.0032	.0035	.0036	.0036	.0037	0.0037	0.0038	0.0038	0 0038	0.0039

Dimensions and tolerances [1]		Size (inches)									
		1⅜	1⁷⁄₁₆	1½	1⁹⁄₁₆	1⅝	1¹¹⁄₁₆	1¾	1¹³⁄₁₆	1⅞	1¹⁵⁄₁₆
Bolts and Screws		*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Major diameter	Max.	1. 3750	1. 4375	1. 5000	1. 5625	1. 6250	1. 6875	1. 7500	1. 8125	1. 8750	1. 9375
	Min.	1. 3660	1. 4285	1. 4910	1. 5535	1. 6160	1. 6785	1. 7410	1. 8035	1. 8660	1. 9285
	Tol.	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Minor diameter	Max.[3]	1. 2983	1. 3608	1. 4233	1. 4858	1. 5483	1. 6108	1. 6733	1. 7358	1. 7983	1. 8608
Class 2, pitch diameter (for general use)	Max.	1. 3344	1. 3969	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969
	Min.	1. 3288	1. 3913	1. 4537	1. 5161	1. 5786	1. 6411	1. 7035	1. 7660	1. 8284	1. 8909
	Tol.	0. 0056	0. 0056	0. 0057	0. 0058	0. 0058	0. 0058	0. 0059	0. 0059	0. 0060	0. 0060
Class 3, pitch diameter	Max.	1. 3344	1. 3969	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969
	Min.	1. 3305	1. 3929	1. 4554	1. 5179	1. 5803	1. 6428	1. 7053	1. 7677	1. 8302	1. 8927
	Tol.	0. 0039	0. 0040	0. 0040	0. 0040	0. 0041	0. 0041	0. 0041	0. 0042	0. 0042	0. 0042
Nuts and Tapped Holes											
Major diameter	Min.[4]	1. 3750	1. 4375	1. 5000	1. 5625	1. 6250	1. 6875	1. 7500	1. 8125	1. 8750	1. 9375
Minor diameter	Min.	1. 3073	1. 3698	1. 4323	1. 4948	1. 5573	1. 6198	1. 6823	1. 7448	1. 8073	1. 8698
	Max.[5]	1. 3153	1. 3778	1. 4403	1. 5028	1. 5653	1. 6278	1. 6903	1. 7528	1. 8150	1. 8778
	Tol.	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080
Class 2, pitch diameter (for general use)	Min.	1. 3344	1. 3969	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969
	Max.	1. 3400	1. 4025	1. 4651	1. 5277	1. 5902	1. 6527	1. 7153	1. 7778	1. 8404	1. 9029
	Tol.	0. 0056	0. 0056	0. 0057	0. 0058	0. 0058	0. 0058	0. 0059	0. 0059	0. 0060	0. 0060
Class 3, pitch diameter	Min.	1. 3344	1. 3969	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969
	Max.	1. 3383	1. 4009	1. 4634	1. 5259	1. 5885	1. 6510	1. 7135	1. 7761	1. 8386	1. 9011
	Tol.	0. 0039	0. 0040	0. 0040	0. 0040	0. 0041	0. 0041	0. 0041	0. 0042	0. 0042	0. 0042

See footnotes at end of table.

TABLE 31.—*Limiting dimensions and tolerances, classes 2 and 3 fit, American National 16-pitch thread series*—Continued

Dimensions and tolerances [1]		Size (inches)									
		2	2 1/16	2 1/8	2 3/16	2 1/4	2 5/16	2 3/8	2 7/16	2 1/2	2 5/8
BOLTS AND SCREWS		*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Major diameter	Max	2. 0000	2. 0625	2. 1250	2. 1875	2. 2500	2. 3125	2. 3750	2. 4375	2. 5000	2. 6250
	Min	1. 9910	2. 0535	2. 1160	2. 1785	2. 2410	2. 3035	2. 3660	2. 4285	2. 4910	2. 6160
	Tol	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Minor diameter	Max [3]	1. 9233	1. 9858	2. 0483	2. 1108	2. 1733	2. 2358	2. 2983	2. 3608	2. 4233	2. 5483
Class 2, pitch diameter (for general use)	Max	1. 9594	2. 0219	2. 0844	2. 1469	2. 2094	2. 2719	2. 3344	2. 3969	2. 4594	2. 5844
	Min	1. 9533	2. 0158	2. 0782	2. 1407	2. 2032	2. 2656	2. 3281	2. 3905	2. 4530	2. 5779
	Tol	0. 0061	0. 0061	0. 0062	0. 0062	0. 0062	0. 0063	0. 0063	0. 0064	0. 0064	0. 0065
Class 3, pitch diameter	Max	1. 9594	2. 0219	2. 0844	2. 1469	2. 2094	2. 2719	2. 3344	2. 3969	2. 4594	2. 5844
	Min	1. 9551	2. 0176	2. 0801	2. 1426	2. 2050	2. 2675	2. 3300	2. 3924	2. 4549	2. 5799
	Tol	0. 0043	0. 0043	0. 0043	0. 0043	0. 0044	0. 0044	0. 0044	0. 0045	0. 0045	0. 0045
NUTS AND TAPPED HOLES											
Major diameter	Min [4]	2. 0000	2. 0625	2. 1250	2. 1875	2. 2500	2. 3125	2. 3750	2. 4375	2. 5000	2. 6250
Minor diameter	Min	1. 9323	1. 9948	2. 0573	2. 1198	2. 1823	2. 2448	2. 3073	2. 3698	2. 4323	2. 5573
	Max [5]	1. 9403	2. 0028	2. 0653	2. 1278	2. 1903	2. 2528	2. 3153	2. 3778	2. 4403	2. 5653
	Tol	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080
Class 2, pitch diameter (for general use)	Min	1. 9594	2. 0219	2. 0844	2. 1469	2. 2094	2. 2719	2. 3344	2. 3969	2. 4594	2. 5844
	Max	1. 9655	2. 0280	2. 0906	2. 1531	2. 2156	2. 2782	2. 3407	2. 4033	2. 4658	2. 5909
	Tol	0. 0061	0. 0061	0. 0062	0. 0062	0. 0062	0. 0063	0. 0063	0. 0064	0. 0064	0. 0065
Class 3, pitch diameter	Min	1. 9594	2. 0219	2. 0844	2. 1469	2. 2094	2. 2719	2. 3344	2. 3969	2. 4594	2. 5844
	Max	1. 9637	2. 0262	2. 0887	2. 1512	2. 2138	2. 2763	2. 3388	2. 4014	2. 4639	2. 5889
	Tol	0. 0043	0. 0043	0. 0043	0. 0043	0. 0044	0. 0044	0. 0044	0. 0045	0. 0045	0. 0045

Dimensions and tolerances [1]	Size (inches)										
	2¾	2⅞	3	3⅛	3¼	3⅜	3½	3⅝	3¾	3⅞	4
Bolts and Screws	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Major diameter Max.	2. 7500	2. 8750	3. 0000	3. 1250	3. 2500	3. 3750	3. 5000	3. 6250	3. 7500	3. 8750	4. 0000
Major diameter Min.	2. 7410	2. 8660	2. 9910	3. 1160	3. 2410	3. 3660	3. 4910	3. 6160	3. 7410	3. 8660	3. 9910
Major diameter Tol.	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Minor diameter Max.[3]	2. 6733	2. 7983	2. 9233	3. 0483	3. 1733	3. 2983	3. 4233	3. 5483	3. 6733	3. 7983	3. 9233
Class 2, pitch diameter (for general use) Max.	2. 7094	2. 8344	2. 9594	3. 0844	3. 2094	3. 3344	3. 4594	3. 5844	3. 7094	3. 8344	3. 9594
Class 2, pitch diameter (for general use) Min.	2. 7028	2. 8278	2. 9527	3. 0776	3. 2025	3. 3275	3. 4524	3. 5773	3. 7023	3. 8272	3. 9522
Class 2, pitch diameter (for general use) Tol.	0. 0066	0. 0066	0. 0067	0. 0068	0. 0069	0. 0069	0. 0070	0. 0071	0. 0071	0. 0072	0. 0072
Class 3, pitch diameter Max.	2. 7094	2. 8344	2. 9594	3. 0844	3. 2094	3. 3344	3. 4594	3. 5844	3. 7094	3. 8344	3. 9594
Class 3, pitch diameter Min.	2. 7048	2. 8298	2. 9547	3. 0797	3. 2046	3. 3296	3. 4545	3. 5795	3. 7044	3. 8294	3. 9543
Class 3, pitch diameter Tol.	0. 0046	0. 0046	0. 0047	0. 0047	0. 0048	0. 0048	0. 0049	0. 0049	0. 0050	0. 0050	0. 0051
Nuts and Tapped Holes											
Major diameter Min.[4]	2. 7500	2. 8750	3. 0000	3. 1250	3. 2500	3. 3750	3. 5000	3. 6250	3. 7500	3. 8750	4. 0000
Minor diameter Min.	2. 6823	2. 8073	2. 9323	3. 0573	3. 1823	3. 3073	3. 4323	3. 5573	3. 6823	3. 8073	3. 9323
Minor diameter Max.[5]	2. 6903	2. 8153	2. 9403	3. 0653	3. 1903	3. 3153	3. 4403	3. 5653	3. 6903	3. 8153	3. 9403
Minor diameter Tol.	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080
Class 2, pitch diameter (for general use) Min.	2. 7094	2. 8344	2. 9594	3. 0844	3. 2094	3. 3344	3. 4594	3. 5844	3. 7094	3. 8344	3. 9594
Class 2, pitch diameter (for general use) Max.	2. 7160	2. 8410	2. 9661	3. 0912	3. 2163	3. 3413	3. 4664	3. 5915	3. 7165	3. 8416	3. 9666
Class 2, pitch diameter (for general use) Tol.	0. 0066	0. 0066	0. 0067	0. 0068	0. 0069	0. 0069	0. 0070	0. 0071	0. 0071	0. 0072	0. 0072
Class 3, pitch diameter Min.	2. 7094	2. 8344	2. 9594	3. 0844	3. 2094	3. 3344	3. 4594	3. 5844	3. 7094	3. 8344	3. 9594
Class 3, pitch diameter Max.	2. 7140	2. 8390	2. 9641	3. 0891	3. 2142	3. 3392	3. 4643	3. 5893	3. 7144	3. 8394	3. 9645
Class 3, pitch diameter Tol.	0. 0046	0. 0046	0. 0047	0. 0047	0. 0048	0. 0048	0. 0049	0. 0049	0. 0050	0. 0050	0. 0051

[1] Pitch-diameter tolerances include errors of lead and angle. The class 2 tolerances are based on formulas in table 116 and a length of engagement of 6 threads or ¾ inch. The class 3 tolerances are 70 percent of the class 2 tolerances. The ¾-inch size being in the American National fine-thread series, the tolerance for this size corresponds to that series.

[2] Standard-size screw and nut of the American National fine-thread series.

[3] Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn-tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to $\frac{1}{8} \times p$, and may be determined by subtracting 0.0406 inch from the minimum pitch diameter of the screw.

[4] Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8} \times p$) and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to $\frac{1}{24} \times p$, and may be determined by adding 0.0496 inch to the maximum pitch diameter of the nut.

[5] Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

AMERICAN NATIONAL EXTRA-FINE-THREAD SERIES

FORM OF THREAD

10. The American National form of thread profile as specified in paragraphs 7 to 7f shall be used.

THREAD SERIES

10a. The American National extra-fine-thread series is intended for special uses where (1) thin-walled material is to be threaded, (2) thread depth of nuts clearing ferrules, coupling flanges, etc., must be held to a minimum, and (3) a maximum practicable number of threads are required within a given thread length. This thread series is the same as the SAE extra-fine-thread series, but it includes additional sizes. The nominal sizes and basic dimensions are specified in table 34. Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 35.

TABLE 34.—*American National extra-fine-thread series*

Identification		Basic diameters			Thread data							
Size	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Pitch, p	Depth of thread, h	Basic width of flat, $p/8$	Minimum width of flat at major diameter of nut, $p/24$	Helix angle at basic pitch diameter, s		Basic area of section at root of thread, $\pi K^2/4$
Inches		*Inches*	*Inches*	*Inches*	*mm*	*Inch*	*Inch*	*Inch*	*Inch*	*deg*	*min*	*Sq. in.*
1/4	32	0. 2500	0. 2297	0. 2094	6. 350	0. 03125	0. 02030	0. 00391	0. 00130	2	29	0. 0344
5/16	32	. 3125	. 2922	. 2719	7. 938	. 03125	. 02030	. 00391	. 00130	1	57	. 0581
3/8	32	. 3750	. 3547	. 3344	9. 525	. 03125	. 02030	. 00391	. 00130	1	36	. 0878
7/16	28	. 4375	. 4143	. 3911	11. 113	. 03571	. 02320	. 00446	. 00149	1	34	. 1201
1/2	28	. 5000	. 4768	. 4536	12. 700	. 03571	. 02320	. 00446	. 00149	1	22	. 1616
9/16	24	. 5625	. 5354	. 5084	14. 288	. 04167	. 02706	. 00521	. 00174	1	25	. 2030
5/8	24	. 6250	. 5979	. 5709	15. 875	. 04167	. 02706	. 00521	. 00174	1	16	. 2560
11/16	24	. 6875	. 6604	. 6334	17. 463	. 04167	. 02706	. 00521	. 00174	1	9	. 3151
3/4	20	. 7500	. 7175	. 6850	19. 050	. 05000	. 03248	. 00625	. 00208	1	16	. 3685
13/16	20	. 8125	. 7800	. 7475	20. 638	. 05000	. 03248	. 00625	. 00208	1	10	. 4388
7/8	20	. 8750	. 8425	. 8100	22. 225	. 05000	. 03248	. 00625	. 00208	1	4	. 5153
15/16	20	. 9375	. 9050	. 8725	23. 813	. 05000	. 03248	. 00625	. 00208	1	0	. 5979
1	20	1. 0000	. 9675	. 9350	25. 400	. 05000	. 03248	. 00625	. 00208	0	57	. 6866
1 1/16	18	1. 0625	1. 0264	. 9903	26. 988	. 05556	. 03608	. 00694	. 00231	0	59	. 7702
1 1/8	18	1. 1250	1. 0889	1. 0528	28. 575	. 05556	. 03608	. 00694	. 00231	0	56	. 8705
1 3/16	18	1. 1875	1. 1514	1. 1153	30. 163	. 05556	. 03608	. 00694	. 00231	0	53	. 9770
1 1/4	18	1. 2500	1. 2139	1. 1778	31. 750	. 05556	. 03608	. 00694	. 00231	0	50	1. 0895
1 5/16	18	1. 3125	1. 2764	1. 2403	33. 338	. 05556	. 03608	. 00694	. 00231	0	48	1. 2082
1 3/8	18	1. 3750	1. 3389	1. 3028	34. 925	. 05556	. 03608	. 00694	. 00231	0	45	1. 3330
1 7/16	18	1. 4375	1. 4014	1. 3653	36. 513	. 05556	. 03608	. 00694	. 00231	0	43	1. 4640
1 1/2	18	1. 5000	1. 4639	1. 4278	38. 100	. 05556	. 03608	. 00694	. 00231	0	42	1. 6011
1 9/16	18	1. 5625	1. 5264	1. 4903	39. 688	. 05556	. 03608	. 00694	. 00231	0	40	1. 7444
1 5/8	18	1. 6250	1. 5889	1. 5528	41. 275	. 05556	. 03608	. 00694	. 00231	0	38	1. 8937
1 11/16	18	1. 6875	1. 6514	1. 6153	42. 863	. 05556	. 03608	. 00694	. 00231	0	37	2. 0493
1 3/4	16	1. 7500	1. 7094	1. 6688	44. 450	. 06250	. 04059	. 00781	. 00260	0	40	2. 1873
2	16	2. 0000	1. 9594	1. 9188	50. 800	. 06250	. 04059	. 00781	. 00260	0	35	2. 8917

TABLE 35.—*Limiting dimensions and tolerances, classes 2 and 3 fits, American National extra-fine thread series*

Dimensions and tolerances [1]	Size (inch)												
	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	13/16	⅞	15/16	1
	Threads per inch												
	32	32	32	28	28	24	24	24	20	20	20	20	20
BOLTS AND SCREWS	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*
Classes 2 and 3, major diameter—Max	0. 2500	0. 3125	0. 3750	0. 4375	0. 5000	0. 5625	0. 6250	0. 6875	0. 7500	0. 8125	0. 8750	0. 9375	1. 0000
Classes 2 and 3, major diameter—Min	0. 2446	0. 3071	0. 3696	0. 4313	0. 4938	0. 5559	0. 6184	0. 6809	0. 7428	0. 8053	0. 8678	0. 9303	0. 9928
Classes 2 and 3, major diameter—Tol	0. 0054	0. 0054	0. 0054	0. 0062	0. 0062	0. 0066	0. 0066	0. 0066	0. 0072	0. 0072	0. 0072	0. 0072	0. 0072
Classes 2 and 3, minor diameter—Max.[2]	0. 2117	0. 2742	0. 3367	0. 3937	0. 4562	0. 5114	0. 5739	0. 6364	0. 6887	0. 7512	0. 8137	0. 8762	0. 9387
Class 2, pitch diameter—Max	0. 2297	0. 2922	0. 3547	0. 4143	0. 4768	0. 5354	0. 5979	0. 6604	0. 7175	0. 7800	0. 8425	0. 9050	0. 9675
Class 2, pitch diameter—Min.[4]	0. 2265	0. 2889	0. 3513	0. 4107	0. 4731	0. 5314	0. 5938	0. 6563	0. 7129	0. 7754	0. 8378	0. 9003	0. 9627
Class 2, pitch diameter—Tol	0. 0032	0. 0033	0. 0034	0. 0036	0. 0037	0. 0040	0. 0041	0. 0041	0. 0046	0. 0046	0. 0047	0. 0047	0. 0048
Class 3, pitch diameter—Max	0. 2297	0. 2922	0. 3547	0. 4143	0. 4768	0. 5354	0. 5979	0. 6604	0. 7175	0. 7800	0. 8425	0. 9050	0. 9675
Class 3, pitch diameter—Min.[4]	0. 2275	0. 2899	0. 3523	0. 4118	0. 4742	0. 5326	0. 5950	0. 6575	0. 7143	0. 7768	0. 8392	0. 9017	0. 9641
Class 3, pitch diameter—Tol	0. 0022	0. 0023	0. 0024	0. 0025	0. 0026	0. 0028	0. 0029	0. 0029	0. 0032	0. 0032	0. 0033	0. 0033	0. 0034
NUTS AND TAPPED HOLES													
Classes 2 and 3, major diameter—Min.[3]	0. 2500	0. 3125	0. 3750	0. 4375	0. 5000	0. 5625	0. 6250	0. 6875	0. 7500	0. 8125	0. 8750	0. 9370	1. 0000
Classes 2 and 3, minor diameter—Min	0. 2162	0. 2787	0. 3412	0. 3988	0. 4613	0. 5174	0. 5799	0. 6424	0. 6959	0. 7584	0. 8209	0. 8834	0. 9459
Classes 2 and 3, minor diameter—Max	0. 2208	0. 2833	0. 3458	0. 4041	0. 4666	0. 5235	0. 5860	0. 6485	0. 7027	0. 7652	0. 8277	0. 8902	0. 9527
Classes 2 and 3, minor diameter—Tol	0. 0046	0. 0046	0. 0046	0. 0053	0. 0053	0. 0061	0. 0061	0. 0061	0. 0068	0. 0068	0. 0068	0. 0068	0. 0068
Class 2, pitch diameter—Min	0. 2297	0. 2922	0. 3547	0. 4143	0. 4768	0. 5354	0. 5979	0. 6604	0. 7175	0. 7800	0. 8425	0. 9050	0. 9675
Class 2, pitch diameter—Max.[4]	0. 2329	0. 2955	0. 3581	0. 4179	0. 4805	0. 5394	0. 6020	0. 6645	0. 7221	0. 7846	0. 8472	0. 9097	0. 9723
Class 2, pitch diameter—Tol	0. 0032	0. 0033	0. 0034	0. 0036	0. 0037	0. 0040	0. 0041	0. 0041	0. 0046	0. 0046	0. 0047	0. 0047	0. 0048
Class 3, pitch diameter—Min	0. 2297	0. 2922	0. 3547	0. 4143	0. 4768	0. 5354	0. 5979	0. 6604	0. 7175	0. 7800	0. 8425	0. 9050	0. 9675
Class 3, pitch diameter—Max.[4]	0. 2319	0. 2945	0. 3571	0. 4168	0. 4794	0. 5382	0. 6008	0. 6633	0. 7207	0. 7832	0. 8458	0. 9083	0. 9709
Class 3, pitch diameter—Tol	0. 0022	0. 0023	0. 0024	0. 0025	0. 0026	0. 0028	0. 0029	0. 0029	0. 0032	0. 0032	0. 0033	0. 0033	0. 0034

Dimensions and tolerances[1]	Size (inches)												
	1 1/16	1 1/8	1 3/16	1 1/4	1 5/16	1 3/8	1 7/16	1 1/2	1 9/16	1 5/8	1 11/16	1 3/4	2
	Threads per inch												
	18	18	18	18	18	18	18	18	18	18	18	16	16
BOLTS AND SCREWS	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Classes 2 and 3, major diameter— Max	1. 0625	1. 1250	1. 1875	1. 2500	1. 3125	1. 3750	1. 4375	1. 5000	1. 5625	1. 6250	1. 6875	1. 7500	2. 0000
Min	1. 0543	1. 1168	1. 1793	1. 2418	1. 3043	1. 3668	1. 4293	1. 4918	1. 5543	1. 6168	1. 6793	1. 7410	1. 9910
Tol	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0082	0. 0090	0. 0090
Classes 2 and 3, minor diameter— Max.[2]	0. 9943	1. 0568	1. 1193	1. 1818	1. 2443	1. 3068	1. 3693	1. 4318	1. 4943	1. 5568	1. 6193	1. 6733	1. 9233
Class 2, pitch diameter— Max	1. 0264	1. 0889	1. 1514	1. 2139	1. 2764	1. 3389	1. 4014	1. 4639	1. 5264	1. 5889	1. 6514	1. 7094	1. 9594
Min.[4]	1. 0216	1. 0837	1. 1462	1. 2086	1. 2711	1. 3335	1. 3960	1. 4584	1. 5209	1. 5833	1. 6458	1. 7035	1. 9533
Tol	0. 0048	0. 0052	0. 0052	0. 0053	0. 0053	0. 0054	0. 0054	0. 0055	0. 0055	0. 0056	0. 0056	0. 0059	0. 0061
Class 3, pitch diameter— Max	1. 0264	1. 0889	1. 1514	1. 2139	1. 2764	1. 3389	1. 4014	1. 4639	1. 5264	1. 5889	1. 6514	1. 7094	1. 9594
Min.[4]	1. 0228	1. 0853	1. 1478	1. 2102	1. 2727	1. 3351	1. 3976	1. 4601	1. 5225	1. 5850	1. 6475	1. 7053	1. 9551
Tol	0. 0036	0. 0036	0. 0036	0. 0037	0. 0037	0. 0038	0. 0038	0. 0038	0. 0039	0. 0039	0. 0039	0. 0041	0. 0043
NUTS AND TAPPED HOLES													
Classes 2 and 3, major diameter— Min.[3]	1. 0625	1. 1250	1. 1875	1. 2500	1. 3125	1. 3750	1. 4375	1. 5000	1. 5625	1. 6250	1. 6875	1. 7500	2. 0000
Classes 2 and 3, minor diameter— Min	1. 0024	1. 0649	1. 1274	1. 1899	1. 2524	1. 3149	1. 3774	1. 4399	1. 5024	1. 5649	1. 6274	1. 6823	1. 9323
Max	1. 0099	1. 0724	1. 1349	1. 1974	1. 2599	1. 3224	1. 3849	1. 4474	1. 5099	1. 5724	1. 6349	1. 6903	1. 9403
Tol	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0075	0. 0080	0. 0080
Class 2, pitch diameter— Min	1. 0264	1. 0889	1. 1514	1. 2139	1. 2764	1. 3389	1. 4014	1. 4639	1. 5264	1. 5889	1. 6514	1. 7094	1. 9594
Max.[4]	1. 0312	1. 0941	1. 1566	1. 2192	1. 2817	1. 3443	1. 4068	1. 4694	1. 5319	1. 5945	1. 6570	1. 7153	1. 9655
Tol	0. 0048	0. 0052	0. 0052	0. 0053	0. 0053	0. 0054	0. 0054	0. 0055	0. 0055	0. 0056	0. 0056	0. 0059	0. 0061
Class 3, pitch diameter— Min	1. 0264	1. 0889	1. 1514	1. 2139	1. 2764	1. 3389	1. 4014	1. 4639	1. 5264	1. 5889	1. 6514	1. 7094	1. 9594
Max.[4]	1. 0300	1. 0925	1. 1550	1. 2176	1. 2801	1. 3427	1. 4052	1. 4677	1. 5303	1. 5928	1. 6553	1. 7135	1. 9637
Tol	0. 0036	0. 0036	0. 0036	0. 0037	0. 0037	0. 0038	0. 0038	0. 0038	0. 0039	0. 0039	0. 0039	0. 0041	0. 0043

[1] Pitch diameter tolerances include errors of lead and angle. The class 2 tolerances are based on the formulas in table 116 and a length of engagement of 6 threads. The class 3 tolerances are 70 percent of the class 2 tolerances.

[2] Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of theminimum screw equal to $\frac{1}{8} \times p$, and may be determined by subtracting the basic thread depth, h (or 0.6495 p), from the minimum pitch diameter of the screw.

[3] Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8} \times p$), and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to $\frac{1}{24} \times p$, and may be determined by adding $1\frac{3}{8} \times h$ (or 0.7939 p) to the maximum pitch diameter of the nut.

[4] These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

SIZES OF TAP DRILLS

11. The essential requirement of a tap drill is that the hole produced by it shall be such that, when tapped with a screw thread, the minor diameter of the tapped hole shall be within the specified limits. It should be noted that the minor diameters of the tapped holes are the same for classes 1 to 4, inclusive.

11a. If the drill is too large, the minor diameter of the tapped hole will also be too large, and the thread in the nut will be too shallow, that is, too small a percentage of a full thread. As an extreme case, the threads in the tapped hole will engage only the tops of the threads on a screw of correct size, and under stress the threads of the screw will strip and the full strength of the fastening will not be developed.

11b. If, on the other hand, the tap drill is too small, the tap will be forced to cut a thread of full depth, and in the extreme case to act as a reamer also. This will result in excessive power consumption and tap breakage, and will also make the minor diameter of the tapped hole dependent upon the minor diameter of the tap. This is undesirable, since the minor diameter of the tap is not, in general, held to the same close limits as the other tap elements, and as a result the minor diameter of a hole tapped under these conditions may be in error even though the tap is otherwise correct.

11c. It is a well-known fact that the size of the hole produced by a tap drill depends to some extent upon the method of grinding the drill, the material drilled, the lubricant used, and the alinement, speed, and feed of operation. This being true, it is apparent that fixing the diameter of the tap drill does not completely fix the diameter of the drilled hole. The most that can be accomplished is to fix the drill diameters between certain limits and to depend upon correct grinding, lubrication, and operation to keep the diameter of the holes within prescribed limits.

11d. There are listed in tables 122 and 123 from Handbook H28, and in the additional tables 123 (A) through 123 (D), all drill sizes regularly carried in stock, both English and metric, which fall between the limiting dimensions of the minor diameter of the threaded hole for the American National coarse-, fine-, extra-fine-, and the 8-, 12-, and 16-pitch-thread series. There are several thread sizes, however, for which there are no stock drills falling within the minor diameter limits, and for these the nearest drills outside of the maximum and minimum limits are listed in italics. If the material to be tapped is such that there is considerable "spin-up" on minor diameter during tapping, then the larger of the two drills listed for a given size should be selected. If the material is cast iron or other material with little or no "spin-up", then the smaller of the two drills listed should be chosen. It will usually cut oversize by a sufficient amount to bring the minor diameter above the minimum limit.

TABLE 122.—*Sizes of tap drills*

[American National coarse-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum [1]	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1	64	0. 0527	0. 0623	0. 0561	1.45 mm	0. 0571	78
					1.50 mm	. 0591	68
					1.55 mm	. 0610	59
2	56	. 0628	. 0737	. 0667	#51	. 0670	82
					#50	. 0700	69
					#49	. 0730	56
3	48	. 0719	. 0841	. 0764	5/64 in	. 0781	77
					#46	. 0810	67
					2.10 mm	. 0827	60
4	40	. 0795	. 0938	. 0849	#44	. 0860	80
					#43	. 0890	71
					2.30 mm	. 0906	66
					3/32 in	. 0937	56
5	40	. 0925	. 1062	. 0979	#39	. 0995	79
					#38 [3]	. 1015	72
					2.60 mm	. 1024	70
					#37	. 1040	65
6	32	. 0974	. 1145	. 1042	#36	. 1065	78
					7/64 in	. 1094	70
					#33	. 1130	62
8	32	. 1234	. 1384	. 1302	3.40 mm	. 1339	74
					#29	. 1360	69
					3.50 mm	. 1378	65
10	24	. 1359	. 1559	. 1449	#26	. 1470	79
					#24	. 1520	70
12	24	. 1619	. 1801	. 1709	11/64 in	. 1719	82
					#17	. 1730	79
					#16	. 1770	72
					#15	. 1800	67
1/4	20	. 1850	. 2060	. 1959	#9	. 1960	83
					#8	. 1990	79
					13/64 in	. 2031	72
5/16	18	. 2403	. 2630	. 2524	F	. 2570	77
					G	. 2610	71
3/8	16	. 2938	. 3184	. 3073	5/16 in	. 3125	77
					O	. 3160	73
7/16	14	. 3447	. 3721	. 3602	U	. 3680	75
1/2	13	. 4001	. 4290	. 4167	27/64 in	. 4219	78
9/16	12	. 4542	. 4850	. 4723	31/64 in	. 4844	72

[1] Present Army Ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

[3] See footnote at end of table 123 (D).

TABLE 122.—*Sizes of tap drills*—Continued

[American National coarse-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum [1]	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
5/8	11	.5069	.5397	.5266	17/32 in	.5312	79
					13.5 mm	.5315	79
3/4	10	.6201	.6553	.6417	16.5 mm	.6496	77
7/8	9	.7307	.7689	.7547	49/64 in	.7656	76
					19.5 mm	.7677	74
1	8	.8376	.8795	.8647	22 mm	.8661	82
					7/8 in	.8750	77
1 1/8	7	.9394	.9858	.9704	25 mm	.9842	76
					63/64 in	.9844	76
1 1/4	7	1.0644	1.1108	1.0954	28 mm	1.1024	80
					1 1/64 in	1.1094	76
1 3/8	6	1.1585	1.2126	1.1946	30.5 mm	1.2008	80
					1 13/64 in	1.2031	79
1 1/2	6	1.2835	1.3376	1.3196	1 21/64 in	1.3281	79
1 3/4	5	1.4902	1.5551	1.5335	39 mm	1.5354	83
					1 35/64 in	1.5469	78
					39.5 mm	1.5551	75
2	4 1/2	1.7113	1.7835	1.7594	1 49/64 in	1.7656	81
					45 mm	1.7716	79
					1 25/32 in	1.7812	76
2 1/4	4 1/2	1.9613	2.0335	2.0094	2 1/64 in	2.0156	81
					51.5 mm	2.0276	77
					2 1/32 in	2.0312	76
2 1/2	4	2.1752	2.2564	2.2294	2 15/64 in	2.2344	82
					57 mm	2.2441	79
					2 1/4 in	2.2500	77
2 3/4	4	2.4252	2.5064	2.4794	63 mm	2.4803	83
					2 31/64 in	2.4844	82
					63.5 mm	2.5000	77
					2 1/2 in	2.5000	77
3	4	2.6752	2.7564	2.7294	2 47/64 in	2.7344	82
					69.5 mm	2.7362	81
					2 3/4 in	2.7500	77
					70 mm	2.7559	75
3 1/4	4	2.9252	3.0064	2.9794	2 63/64 in	2.9844	82
					76 mm	2.9921	79
					3	3.0000	77
3 1/2	4	3.1752	3.2564	3.2294	3 1/4 in	3.2500	77
3 3/4	4	3.4252	3.5064	3.4794	3 1/2 in	3.5000	77

TABLE 123.—*Sizes of tap drills*

[American National fine-thread series][1]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum [2]	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
0	80	0.0438	0.0514	0.0465	3/64 in	0.0469	81
					1.25 mm	.0492	67
1	72	.0550	.0634	.0580	1.50 mm	.0591	77
					1.55 mm	.0610	67
2	64	.0657	.0746	.0691	#50	.0700	79
					#49	.0730	64
3	56	.0758	.0856	.0797	#46	.0810	78
					2.10 mm	.0827	70
					#44	.0860	56
4	48	.0849	.0960	.0894	2.30 mm	.0906	79
					3/32 in	.0937	68
					#41	.0960	59
5	44	.0955	.1068	.1004	2.60 mm	.1024	77
					#37	.1040	71
					#36	.1065	63
6	40	.1055	.1179	.1109	#33	.1130	77
					#32	.1160	68
8	36	.1279	.1402	.1339	3.40 mm	.1339	83
					#29	.1360	78
					3.50 mm	.1378	73
					9/64 in	.1406	65
10	32	.1494	.1624	.1562	5/32 in	.1562	83
					#21 [3]	.1590	76
					#20	.1610	71
					#19	.1660	59
12	28	.1696	.1835	.1773	#15	.1800	78
					4.70 mm #13	.1850	67
					3/16 in	.1875	61
1/4	28	.2036	.2173	.2113	#3	.2130	80
5/16f	24	.2584	.2739	.2674	17/64 in	.2656	87
					I	.2720	75
3/8	24	.3209	.3364	.3299	Q	.3320	79

[1] Drill sizes up to 1/2 inch are in agreement with ASA B5.12—1940, Twist Drills, Straight Shank, published by the ASME, 29 West 39th Street, New York, N. Y.

[2] Present Army Ordnance practice follows NBS Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

[3] See footnote at end of table 123 (D).

TABLE 123.—*Sizes of tap drills*—Continued

[American National fine-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
7/16	20	0.3725	0.3906	0.3834	W	0.3860	79
					25/64 in	.3906	72
1/2	20	.4350	.4531	.4459	29/64 in	.4531	72
9/16	18	.4903	.5100	.5024	0.5062	.5062	78
5/8	18	.5528	.5725	.5649	14.5 mm	.5709	75
3/4	16	.6688	.6903	.6823	11/16 in	.6875	77
					17.5 mm	.6890	75
7/8	14	.7822	.8062	.7977	51/64 in	.7969	84
					20.5 mm	.8071	73
1	14	.9072	.9312	.9227	23.5 mm	.9252	81
1 1/8	12	1.0167	1.0438	1.0348	26.5 mm	1.0433	75
1 1/4	12	1.1417	1.1688	1.1598	29.5 mm	1.1614	82
1 3/8	12	1.2667	1.2938	1.2848	9/32 in	1.2812	8
					19/64 in	1.2969	72
1 1/2	12	1.3917	1.4188	1.4098	36 mm	1.4173	76

TABLE 123 (A).—*Sizes of tap drills*

[American National 8-pitch-thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum [1]	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1	8	0. 8376	0. 8795	0. 8647	22 mm	0. 8661	82
					7/8 in	. 8750	77
1 1/8	8	. 9626	1. 0045	. 9897	1 in	1. 0000	77
					25.5 mm	1. 0039	75
1 1/4	8	1. 0876	1. 1295	1. 1147	28.5 mm	1. 1220	79
					1 1/8 in	1. 1250	77
1 3/8	8	1. 2126	1. 2545	1. 2397	31.5 mm	1. 2402	83
					1 1/4 in	1. 2500	77
1 1/2	8	1. 3376	1. 3795	1. 3647	1 3/8 in	1. 3750	77
					35 mm	1. 3780	75
1 5/8	8	1. 4626	1. 5045	1. 4897	38 mm	1. 4961	79
					1 1/2 in	1. 5000	77
1 3/4	8	1. 5876	1. 6295	1. 6147	1 5/8 in	1. 6250	77
1 7/8	8	1. 7126	1. 7545	1. 7397	1 3/4 in	1. 7500	77
					44.5 mm	1. 7520	76
2	8	1. 8376	1. 8795	1. 8647	47.5 mm	1. 8701	80
					1 7/8 in	1. 8750	77
2 1/8	8	1. 9626	2. 0045	1. 9897	2 in	2. 0000	77
2 1/4	8	2. 0876	2. 1295	2. 1147	2 1/8 in	2. 1250	77
					54 mm	2. 1260	76
2 1/2	8	2. 3376	2. 3795	2. 3647	2 3/8 in	2. 3750	77
2 3/4	8	2. 5876	2. 6295	2. 6147	66.5 mm	2. 6181	81
					2 5/8 in	2. 6250	77
3	8	2. 8376	2. 8795	2. 8647	73 mm	2. 8740	78
					2 7/8 in	2. 8750	77
3 1/4	8	3. 0876	3. 1295	3. 1147	3 1/8 in	3. 1250	77
3 1/2	8	3. 3376	3. 3795	3. 3647	3 3/8 in	3. 3750	77

[1] Present Army Ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

Table 123 (B).—*Sizes of tap drills*

[American National 12-pitch thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth[1]		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1/2	12	0. 3917	0. 4225	0. 4098	Z[3]	0. 4130	80
					10.5 mm[3]	. 4134	80
					27/64 in	. 4219	72
9/16	12	. 4542	. 4850	. 4723	12 mm[3]	. 4724	83
					31/64 in	. 4844	72
5/8	12	. 5167	. 5438	. 5348	*13.5 mm*	*. 5315*	*86*
					35/64 in	*. 5469*	*72*
11/16	12	. 5792	. 6063	. 5973	*19/32 in*	*. 5938*	*87*
					39/64 in	*. 6094*	*72*
3/4	12	. 6417	. 6688	. 6598	*21/32 in*	*. 6562*	*87*
					17 mm	*. 6693*	*75*
13/16	12	. 7042	. 7313	. 7223	18.5 mm	. 7283	78
7/8	12	. 7667	. 7938	. 7848	20 mm	. 7874	81
15/16	12	. 8292	. 8563	. 8473	*21.5 mm*	*. 8465*	*84*
					55/64 in	*. 8594*	*72*
1	12	. 8917	. 9188	9098	*29/32 in*	*. 9062*	*87*
					59/64 in	*. 9219*	*72*
1 1/16	12	. 9542	. 9813	. 9723	*31/32 in*	*. 9687*	*87*
					25 mm	*. 9843*	*72*
1 1/8	12	1. 0167	1. 0438	1. 0348	26.5 mm	1. 0433	75
1 3/16	12	1. 0792	1. 1063	1. 0973	28 mm	1. 1024	79
1 1/4	12	1. 1417	1. 1688	1. 1598	29.5 mm	1. 1614	82
1 5/16	12	1. 2042	1. 2313	1. 2223	*31 mm*	*1. 2205*	*85*
					1 15/64 in	*1. 2344*	*72*
1 3/8	12	1. 2667	1. 2938	1. 2848	*1 9/32 in*	*1. 2812*	*87*
					1 19/64 in	*1. 2969*	*72*
1 7/16	12	1. 3292	1. 3563	1. 3473	*1 11/32 in*	*1. 3438*	*87*
					34.5 mm	*1. 3583*	*73*

[1] Sizes in italics are not within the specified limits for minor diameter of nut.
[3] See footnote at end of table 123 (D).

Table 123 (B).—*Sizes of tap drills*—Continued

[American National 12-pitch thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth[1]		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1½	12	1. 3917	1. 4188	1. 4098	36 mm	1. 4173	76
1⅝	12	1. 5167	1. 5438	1. 5348	39 mm	1. 5354	83
1¾	12	1. 6417	1. 6688	1. 6598	*1 21/32 in*	*1. 6562*	*87*
					1 43/64 in	*1. 6719*	*72*
1⅞	12	1. 7667	1. 7938	1. 7848	45.5 mm	1. 7913	77
2	12	1. 8917	1. 9188	1. 9098	*48.5 mm*	*1. 9094*	*84*
					1 59/64 in	*1. 9219*	*72*
2⅛	12	2. 0167	2. 0438	2. 0348	*2 1/32 in*	*2. 0312*	*87*
					2 3/64 in	*2. 0469*	*72*
2¼	12	2. 1417	2. 1688	2. 1598	55 mm	2. 1654	78
2⅜	12	2. 2667	2. 2938	2. 2848	*58 mm*	*2. 2835*	*85*
					2 19/64 in	*2. 2969*	*72*
2½	12	2. 3917	2. 4188	2. 4098	*2 13/32 in*	*2. 4062*	*87*
					61.5 mm	*2. 4213*	*73*
2⅝	12	2. 5167	2. 5438	2. 5348	64.5 mm	2. 5394	79
2¾	12	2. 6417	2. 6688	2. 6598	*67.5 mm*	*2. 6575*	*85*
					2 43/64 in	*2. 6719*	*72*
2⅞	12	2. 7667	2. 7938	2. 7848	*2 25/32 in*	*2. 7812*	*87*
					71 mm	*2. 7953*	*74*
3	12	2. 8917	2. 9188	2. 9098	74 mm	2. 9134	80
3⅛	12	3. 0167	3. 0438	3. 0348	*3 1/32 in*	*3. 0312*	*87*
					3 1/16 in	*3. 0625*	*58*
3¼	12	3. 1417	3. 1688	3. 1598	*3 5/32 in*	*3. 1562*	*87*
					3 3/16 in	*3. 1875*	*58*
3⅜	12	3. 2667	3. 2938	3. 2848	*3 9/32 in*	*3. 2812*	*87*
					3 5/16 in	*3. 3125*	*58*
3½	12	3. 3917	3. 4188	3. 4098	*3 7/16 in*	*3. 4375*	*58*

[1] Sizes in italics are not within the specified limits for minor diameter of nut.

TABLE 123 (C).—*Sizes of tap drills*

[American National 16-pitch-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum [1]	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
3/4	16	0. 6688	0. 6903	0. 6823	11/16 in	0. 6875	77
					17.5 mm	. 6890	75
13/16	16	. 7313	. 7528	. 7448	19 mm	. 7480	79
					3/4 in	. 7500	77
7/8	16	. 7938	. 8153	. 8073	13/16 in	. 8125	77
15/16	16	. 8563	. 8778	. 8698	7/8 in	. 8750	77
1	16	. 9188	. 9403	. 9323	15/16 in	. 9375	77
1 1/16	16	. 9813	1. 0028	. 9948	1 in	1. 0000	77
1 1/8	16	1. 0438	1. 0653	1. 0573	1 1/16 in	1. 0625	77
					27 mm	1. 0630	76
1 3/16	16	1. 1063	1. 1278	1. 1198	28.5 mm	1. 1220	81
					1 1/8 in	1. 1250	77
1 1/4	16	1. 1688	1. 1903	1. 1823	1 3/16 in	1. 1875	77
1 5/16	16	1. 2313	1. 2528	1. 2448	1 1/4 in	1. 2500	77
1 3/8	16	1. 2938	1. 3153	1. 3073	1 5/16 in	1. 3125	77
1 7/16	16	1. 3563	1. 3778	1. 3698	1 3/8 in	1. 3750	77
1 1/2	16	1. 4188	1. 4403	1. 4323	36.5 mm	1. 4370	78
					1 7/16 in	1. 4375	77
1 9/16	16	1. 4813	1. 5028	1. 4948	38 mm	1. 4961	82
					1 1/2 in	1. 5000	77
1 5/8	16	1. 5438	1. 5653	1. 5573	1 9/16 in	1. 5625	77
1 11/16	16	1. 6063	1. 6278	1. 6198	1 5/8 in	1. 6250	77
1 3/4	16	1. 6688	1. 6903	1. 6823	1 11/16 in	1. 6875	77
1 13/16	16	1. 7313	1. 7528	1. 7448	1 3/4 in	1. 7500	77
					44.5 mm	1. 7520	75

[1] Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

TABLE 123 (C).—*Sizes of tap drills*—Continued

[American National 16-pitch-thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1⅞	16	1. 7938	1. 8153	1. 8073	46 mm 1 13/16 in	1. 8110 1. 8125	79 77
1 15/16	16	1. 8563	1. 8778	1. 8698	47.5 mm 1⅞ in	1. 8701 1. 8750	83 77
2	16	1. 9188	1. 9403	1. 9323	1 15/16 in	1. 9375	77
2 1/16	16	1. 9813	2. 0028	1. 9948	2 in	2. 0000	77
2⅛	16	2. 0438	2. 0653	2. 0573	2 1/16 in	2. 0625	77
2 3/16	16	2. 1063	2. 1278	2. 1198	2⅛ in 54 mm	2. 1250 2. 1260	77 76
2¼	16	2. 1688	2. 1903	2. 1823	55.5 mm 2 3/16 in	2. 1850 2. 1875	80 77
2 5/16	16	2. 2313	2. 2528	2. 2448	2¼ in	2. 2500	77
2⅜	16	2. 2938	2. 3153	2. 3073	2 5/16 in	2. 3125	77
2 7/16	16	2. 3563	2. 3778	2. 3698	2⅜ in	2. 3750	77
2½	16	2. 4188	2. 4403	2. 4323	2 7/16 in	2. 4375	77
2 5/8	16	2. 5438	2. 5653	2. 5573	65 mm 2 9/16 in	2. 5590 2. 5625	81 77
2¾	16	2. 6688	2. 6903	2. 6823	2 11/16 in	2. 6875	77
2⅞	16	2. 7938	2. 8153	2. 8073	2 13/16 in 71.5 mm	2. 8125 2. 8150	77 74
3	16	2. 9188	2. 9403	2. 9323	74.5 mm 2 15/16 in	2. 9331 2. 9375	82 77
3⅛	16	3. 0438	3. 0653	3. 0573	3 1/16 in	3. 0625	77
3¼	16	3. 1688	3. 1903	3. 1823	3 3/16 in	3. 1875	77
3⅜	16	3. 2938	3. 3153	3. 3073	3 5/16 in	3. 3125	77
3½	16	3. 4188	3. 4403	3. 4323	3 7/16 in	3. 4375	77

TABLE 123 (D).—*Sizes of tap drills*

[American National extra-fine-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth[1]		
		Basic	Maximum[2]	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1/4	32	0.2094	0.2208	0.2162	5.5 mm.[3]	0.2165	83
					7/32 in	.2188	77
					5.6 mm.[3]	.2205	73
5/16	32	.2719	.2833	.2787	7.1 mm.[3]	.2795	81
					K[3]	.2810	77
					9/32 in	.2812	77
3/8	32	.3344	.3458	.3412	8.7 mm.[3]	.3425	80
					11/32 in	.3438	77
					8.75 mm.[3]	.3445	75
7/16	28	.3911	.4041	.3988	*X*	*.3970*	*87*
					Y[3]	.4040	72
1/2	28	.4536	.4666	.4613	*29/64 in*	*.4531*	*101*
					15/32 in	*.4687*	*67*
9/16	24	.5084	.5235	.5174	*33/64 in*	*.5156*	*87*
					17/32 in	*.5312*	*58*
5/8	24	.5709	.5860	.5799	*37/64 in*	*.5781*	*87*
					15 mm	*.5906*	*64*
11/16	24	.6334	.6485	.6424	*41/64 in*	*.6406*	*87*
					16.5 mm	*.6496*	*70*
3/4	20	.6850	.7027	.6959	*17.5 mm*	*.6890*	*94*
					45/64 in	*.7031*	*72*
13/16	20	.7475	.7652	.7584	*3/4 in*	*.7500*	*96*
					49/64 in	*.7656*	*72*
7/8	20	.8100	.8277	.8209	21 mm	.8268	74
15/16	20	.8725	.8902	.8834	22.5 mm	.8858	80
1	20	.9350	.9527	.9459	*24 mm*	*.9449*	*85*
					61/64 in	*.9531*	*72*
1 1/16	18	.9903	1.0099	1.0024	25.5 mm	1.0040	81
1 1/8	18	1.0528	1.0724	1.0649	*27 mm*	*1.0630*	*86*
					1 5/64 in	*1.0781*	*65*
1 3/16	18	1.1153	1.1349	1.1274	*1 1/8 in*	*1.1250.*	*87*
					1 9/64 in	*1.1406*	*65*
1 1/4	18	1.1778	1.1974	1.1899	*1 3/16 in*	*1.1875*	*87*
					30.5 mm	*1.2008*	*68*

[1] Sizes in italics are not within the specified limits for minor diameter of nut.

[2] Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

[3] These sizes are not included as standard in American Standard B 5.12–1940 for Twist Drills, Straight Shank, but are listed in the appendix thereto.

TABLE 123 (D).—*Sizes of tap drills*—Continued

[American National extra-fine-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		Inch	*Inch*	*Inch*		*Inch*	
1 5/16	18	1. 2403	1. 2599	1. 2524	32 mm	1. 2598	73
1 3/8	18	1. 3028	1. 3224	1. 3149	33.5 mm	1. 3189	78
1 7/16	18	1. 3653	1. 3849	1. 3774	35 mm	1. 3780	82
1 1/2	18	1. 4278	1. 4474	1. 4399	*1 7/16 in*	*1. 4375*	*87*
					1 29/64 in	*1. 4531*	*65*
1 9/16	18	1. 4903	1. 5099	1. 5024	*1 1/2 in*	*1. 5000*	*87*
					1 33/64 in	*1. 5156*	*65*
1 5/8	18	1. 5528	1. 5724	1. 5649	*1 9/16 in*	*1. 5625*	*87*
					40 mm	*1. 5748*	*70*
1 11/16	18	1. 6153	1. 6349	1. 6274	41.5 mm	1. 6339	74
1 3/4	16	1. 6688	1. 6903	1. 6823	1 11/16 in	1. 6875	77
2	16	1. 9188	1. 9403	1. 9323	1 15/16 in	1. 9375	77

LABELING

12. Where the dimensions are to be guaranteed, the following form of statement on labels, invoices, catalogues, etc., is recommended:

> The _____ guarantees that for the respective classes of fit as identified or labeled, these screw threads conform to Commercial Standard CS24–43 as issued by the National Bureau of Standards of the U. S. Department of Commerce.
>
> Company

EFFECTIVE DATE

The standard is effective for new production from February 10, 1943.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Most organizations nominated their own representatives. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the committee.

Manufacturers:

CARL W. BETTCHER (Chairman), Eastern Machine Screw Corporation, New Haven, Conn.

J. J. TOMALIS, American Screw Co., 21 Stevens Street, Providence, R. I.

George S. Case, Lamson & Sessions Co., 1975 W. 85th Street, Cleveland, Ohio.
J. S. Davey, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
J. H. Edmonds, Lebanon Plant, Bethlehem Steel Co., Lebanon, Pa.
H. C. Erdman, National Screw & Mfg. Co., 2440 E. 75th St., Cleveland, Ohio
W. C. Stewart, American Institute, Bolt, Nut and Rivet Mfrs., 1550 Hanna Bldg., Cleveland, Ohio.
F. P. Tisch, Pheoll Mfg. Co., 5700 Roosevelt Road, Chicago, Ill.
Charles C. Winter, Winter Bros. Co., Wrentham, Mass.

Distributors:

G. Cheston Carey, Carey Machinery & Supply Co., 119 E. Lombard Street' Baltimore, Md.
H. H. Smith, Strong, Carlisle & Hammond Co., 1392 W. 3d Street, Cleveland, Ohio.

Consumers:

W. B. Barth, General Motors Corporation, Standards Section, 15–158 General Motors Bldg., Detroit, Mich.
Lt. Col. Harry B. Hambleton, Office of Chief of Ordnance, War Department, Washington, D. C.
A. M. Houser, Crane Company, 836 S. Michigan Ave., Chicago, Ill.
L. A. Wenn, International Business Machines Co., North Street, Endicott, N. Y.
H. W. Samson, Standards Department, General Electric Co., Schenectady, N. Y.
Lt. Comdr. J. W. Huckert, USN, Naval Gun Factory, U. S. Navy Yard, Washington, D. C.

Laboratories:

H. W. Bearce, Interdepartmental Screw Thread Committee, National Bureau of Standards, Washington, D. C.
Earle Buckingham, Massachusetts Institute of Technology, Cambridge, Mass.

HISTORY OF PROJECT

In the United States the standardization of screw threads was begun with the appointment of a special committee by the Franklin Institute on April 21, 1861, for the investigation of a proper system of screw threads, bolt heads, and nuts. From this beginning there was developed a system variously known as the Franklin Institute thread, the Sellers thread, or the United States thread. Later a system having finer pitches was recommended by the Society of Automotive Engineers, and a machine-screw-thread series providing smaller sizes of screws than the United States series was recommended by the American Society of Mechanical Engineers.

On July 18, 1918, the Congress authorized the appointment of the National Screw Thread Commission, consisting of nine members, to "ascertain and establish standards for screw threads" which when "accepted and approved shall be adopted and used in the several manufacturing plants under the control of the War and Navy Departments, and, so far as practicable, in all specifications for screw threads in proposals for manufactured articles, parts, or materials to be used under the direction of these departments." The National Screw Thread Commission issued printed reports in 1921, 1924, 1928, and 1933, based upon a long series of hearings and investigations both in the United States and abroad.

While the recommendations of the NSTC are mandatory upon the War and Navy Departments, and, as far as practicable, apply also to purchases by all Government departments, it seemed desirable to determine the extent to which these standards were being applied within the industries concerned. Accordingly, on May 8, 1929, the

National Screw Thread Commission requested the cooperation of the National Bureau of Standards to determine the extent of adoption and use of the NSTC recommendations in industry.

The hearing of the NSTC having performed all the essential functions of the general conferences normally required as a part of the procedure leading to the establishment of commercial standards, and the recommendations of the NSTC having attained national recognition and a large following, it seemed logical to proceed directly with the circulation of the essential screw-thread tables and tolerances to industry for written acceptance. This was done and resulted in the impressive roster of organizations, listed on page V of CS24–30 and CS25–30, which indicated in writing their intention of making the American National Standard Screw Threads, as set forth in CS24–30 and CS25–30, their standard of practice, effective from July 1, 1930.

First revision and consolidation.—On March 25, 1942, the Interdepartmental Screw Thread Committee,[5] recognizing that the Commercial Standards CS24–30 and CS25–30 had been rendered obsolete by revisions since their publication, requested the development of revised and additional standards in line with the generally accepted commercial practice recorded in National Bureau of Standards Handbook H28.

The National Bureau of Standards established a standing committee representing manufacturers, distributors, consumers, and laboratories, which reviewed, revised, and approved for circulation within the industry the Recommended Commercial Standard for Screw Threads and Tap Drill Sizes prepared by the Bureau.

Upon written acceptance by a predominant majority of users, distributors, and producers, as listed herein, announcement was made on November 10, 1942, that the standard would become effective for new production from February 10, 1943.

[5] The National Screw Thread Commission was abolished by Executive Order dated June 10, 1933. The Interdepartmental Screw Thread Committee was established September 14, 1939, by the Departments of War, Navy, and Commerce to promote uniformity in screw-thread standards in the Departments concerned.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date _____

Division of Trade Standards,
National Bureau of Standards,
Washington, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS24–43 as our standard of practice in the

Production [1] Distribution [1] Use [1] Testing [1]

of screw threads and tap-drill sizes.

We will assist in securing its general recognition and use, and will cooperate with the standing committee to effect revisions of the standard when necessary.

Signature of individual officer _____
(in ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____
(Fill in exactly as it should be listed)

Street address _____

City and State _____

[1] Please designate which group you represent by drawing lines through the other three. Please file separate acceptances for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade papers, colleges, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measureable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations and individuals listed below have accepted these dimensions as their standard of practice in the production, distribution, and use of screw threads and tap-drill sizes. Such endorsement does not signify that they may not find it necessary to deviate from the standard, nor that producers so listed guarantee all of their products in this field to conform with the requirements of this standard. Therefore specific evidence of conformity should be obtained where required.

ASSOCIATIONS

Allied Building Metal Industries, New York, N. Y.
American Association of Engineers, Chicago, Ill.
American Institute of Bolt, Nut, & Rivet Manufacturers, Cleveland, Ohio.
American Railway Engineering Association, Chicago, Ill. (In Principle.)
American Supply & Machinery Manufacturers' Association, Inc., Pittsburgh, Pa. (In Principle.)
Associated General Contractors of America, Inc., Washington, D. C.
Manufacturers Standardization Society of the Valve & Fittings Industry, New York, N. Y.
National Association Master Plumbers, New York, N. Y.
National Retail Hardware Association, Indianapolis, Ind.
National Screw Machine Products Association, Cleveland, Ohio.
Southern Hardware Jobbers Association, Atlanta, Ga.
Southern Supply & Machinery Distributors' Association, Inc., Atlanta, Ga.

FIRMS

Accurate Tool Co., Detroit, Mich.
Acme Machine Tool Co., The, Cincinnati, Ohio.
Adams Co., The, Dubuque, Iowa.
Aero Supply Manufacturing Co., Inc., Corry, Pa.
Aircooled Motors Corporation, Syracuse, N. Y.
Ajax Bolt & Screw Co., Detroit, Mich.
Allen Manufacturing Co., The, Hartford, Conn.
Almond Manufacturing Co., T. R., Ashburnham, Mass.
Aluminum & Brass Co., Lockport, N. Y.
Aluminum Company of America, Pittsburgh, Pa.
American Bridge Co., Pittsburgh, Pa.
American Locomotive Co., Schenectady, N. Y.
American Manganese Bronze Co., Holmesburg, Philadelphia, Pa.
American Seating Co., Grand Rapids, Mich.
American Screw Co., Providence, R. I.
Armstrong Manufacturing Co., The, Bridgeport, Conn.
Arrow Automatic Products Corporation, New York, N. Y.
Atlantic Machine Screw Co., S. Boston, Mass.
Atlas Bolt & Screw Co., The, Cleveland, Ohio.
Atlas Copper & Brass Manufacturing Co., Chicago, Ill.
Autocar Co., Ardmore, Pa.
Automatic Machinery Manufacturing Corporation, Bridgeport, Conn.
Automatic Products Co., Milwaukee, Wis.
Autoscrew Co., New York, N. Y.
Avey Drilling Machine Co., The, Covington. Ky.
Babson-Dow Manufacturing Co., Roxbury, (Boston) Mass.
Baldwin Locomotive Works, The, Philadelphia, Pa.
Bard Manufacturing Co., Royersford, Pa.
Bath & Co., John, Worcester, Mass.
Bausch & Lomb Optical Co., Rochester, N. Y.
Bausch Machine Tool Co., Springfield, Mass.
Bayonne Bolt Corporation, Bayonne, N. J.
Beard Tool Co., L. O., Lancaster, Pa.

Bell Co., Inc., The David, Buffalo, N. Y.
Bethlehem Steel Co., Lebanon, Pa.
Bicknell Manufacturing Co., Rockland, Maine
Biglow & Co., Inc., L. C., New York, N. Y.
Billings & Spencer Co., The, Hartford, Conn.
Bommer Spring Hinge Co., Brooklyn, N. Y.
Boston Machine Works Co., Lynn, Mass.
Botwinik Brothers, Inc., Hamden, New Haven, Conn.
Brightman Nut & Manufacturing Co., Sandusky, Ohio.
Brill Co., The J. G., Philadelphia, Pa.
Brown Bag Filling Machine Co., The, Fitchburg, Mass.
Brown & Sharpe Manufacturing Co., Providence, R. I.
Brown-Wales Co., Boston, Mass.
Buckeye Traction Ditcher Co., The, Findlay, Ohio.
Buda Co., The, Harvey, Ill.
Buerk Tool Works, Buffalo, N. Y.
Buffalo Bolt Co., North Tonawanda, N. Y.
Camden Forge Co., Camden, N. J.
Cap Screw & Nut Co. of America, Inc., New York, N. Y.
Carey Machinery & Supply Co., Baltimore, Md.
Central Screw Co., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chatillon & Sons, John, New York, N. Y.
Chicago, Rock Island & Pacific Railway Co., Chicago, Ill.
Chicago Screw Co., The, Chicago, Ill.
Chrysler Corporation, Detroit, Mich.
Cincinnati Planer Co., The, Cincinnati, Ohio.
City Engineering Co., The, Dayton, Ohio.
Clark, Jas., Jr., Paterson, N. J.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Metal Products, Inc., Bridgeport, Conn.
Clendenin Bros. Inc., Baltimore, Md.
Cleveland Automatic Machine Co., The, Cleveland, Ohio.
Cleveland Cap Screw Co., The, Cleveland, Ohio.
Cleveland Die & Manufacturing Co., The, Cleveland, Ohio.
Columbus Bolt Works Co., The, Columbus, Ohio.
Commonwealth Brass Corporation, Detroit, Mich.
Comtor Co., The, Waltham, Mass.
Connecticut Tool & Engineering Co., Bridgeport, Conn.
Continental Screw Co., New Bedford, Mass.
Cox & Sons Co., The, Bridgeton, N. J.
Crane Co., Chicago, Ill.
Curtis Screw Co., Inc., Buffalo, N. Y.
Dallett Co., The, Philadelphia, Pa.
Dardelet Threadlock Corporation, Detroit, Mich.
Davis & Hemphill, Elkridge, Md.
Defiance Machine Works, Inc., Defiance, Ohio.
Detroit Nut Co., Inc., Detroit, Mich.
Detroit Plating Industries, Detroit, Mich.
Detroit Tap & Tool Co., Detroit, Mich.
Doehler Die Casting Co., Batavia, N. Y.
Dravo Corporation Engineering Works Division, Pittsburgh, Pa.
Eastern Machine Screw Corporation, The, New Haven, Conn.
Eastman Kodak Co., Hawk-Eye Division, Rochester, N. Y.
Eastwood-Nealley Corp., Belleville, N. J.
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Ekstrom, Carlson & Co., Rockford, Ill.
Electric Boat Co., Groton, Conn.
Elterich Co., Chas., New York, N. Y. (In Principle.)
Emery Industries, Inc., Cincinnati, Ohio.
Engineers Club of Philadelphia, Pa., Philadelphia, Pa. (In Principle.)
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Essley Machinery Co., The E. L., Chicago, Ill. (In Principle.)
Fairbanks, Morse & Co., Beloit, Wis.
Federal Products Corporation, Providence, R. I.
Federal Screw Works, Detroit, Mich.
Ferry Cap & Set Screw Co., The, Cleveland, Ohio.
Firestone Steel Prdoucts Co., Akron, Ohio.
Firestone Tire & Rubber Co., Akron, Ohio.
Flannery Bolt Co., Bridgeville, Pa.
Fox Munitions Corporation, Philadelphia, Pa.
Foxboro Co., The, Foxboro, Mass.
General Engineering Works, Chicago, Ill.
General Electric Co., Schenectady, N. Y.
General Manufacturing Co., The, Waterbury, Conn.
General Motors Corporation, Detroit, Mich.
Geometric Tool Co., The, New Haven, Conn.
Gibbs & Cox, Inc., New York, N. Y.
Gisholt Machine Co., Madison, Wis.
Globe Products Co., The, Cleveland, Ohio.
Grabler Manufacturing Co., The, Cleveland, Ohio.
Grant Manufacturing & Machine Co., The, Bridgeport, Conn.
Graves Elevator Co., Inc., Rochester, N. Y.
Greenfield Tap & Die Corporation, Greenfield, Mass.
Greenlee Bros. & Co., Rockford, Ill.

Grimm Hardware Co., Inc., W. H., Chicago, Ill.
Gurley, W. & L. E., Troy, N. Y.
Haines Gauge Co., Inc., Philadelphia, Pa.
Hardware Products Co., Inc., Boston, Mass.
Harper Co., The H. M., Chicago, Ill.
Hartford Machine Screw Co., Hartford, Conn.
Hassall, Inc., John, Brooklyn, N. Y.
Haynes Stellite Co., Kokomo, Ind.
Hodell Chain Co., The, Cleveland, Ohio.
Hood Co., R. H., Philadelphia, Pa.
Hooper Co., Inc., F. X., Glenarm, Md.
Hudson Motor Car Co., U. S. Naval Ordnance Plant, Center Line, Mich.
Illinois Iron & Bolt Co., Carpentersville, Ill.
Imsande Screw Products Co., Cincinnati, Ohio.
Indicating Calipers Corporation, New York, N. Y.
International Business Machines Corporation, Endicott, N. Y.
International Harvester Co., Chicago, Ill.
International Machine Tool Corporation, Foster Division, Elkhart, Ind.
International-Stacey Corporation, International Derrick & Equipment Division, Columbus, Ohio.
Isaacson Iron Works, Seattle, Wash.
Iverson & Laux, Inc., Chicago, Ill.
Jacobs Aircraft Engine Co., Plant No. 1, Pottstown, Pa.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Johnson Automatics Manufacturing Co., Providence, R. I.
Johnson Rule Manufacturing Co., E. P., Chicago, Ill.
Johnston & Jennings Co., The, Cleveland, Ohio.
Jones & Lamson Machine Co., Springfield, Vt.
Jordan Machine Products, Inc., Detroit, Mich.
Judson-Pacific Co., San Francisco, Calif.
Kaufman Manufacturing Co., L. J., Manitowoc, Wis.
King Engineering Corporation, Ann Arbor, Mich.
Kinner Motors, Inc., Glendale, Calif.
Kramer Co., C. P., Chicago, Ill.
Lamson & Sessions Co., The, Cleveland, Ohio.
Landis Machine Co., Waynesboro, Pa.
Lanman Co., The E. B., East Chicago, Ind.
Larson Tool & Stamping Co., Attleboro, Mass.
Lima Locomotive Works, Inc., Lima, Ohio.
Link-Belt Ordnance Co., Chicago, Ill.
Lionel Corporation, The, Irvington, N. J.
Los Angeles Testing Laboratory, Los Angeles, Calif.
Lundberg Screw Products Co., Lansing, Mich.
Machined Products Co., Louisville, Ky.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Macy & Co., Inc., R. H., New York, N. Y.
Maine Steel, Inc., South Portland, Maine.
Mann & Co., Hutchinson, Kans.
Maryland Bolt & Nut Co., The, Baltimore, Md.
Mattatuck Manufacturing Co., The, Waterbury, Conn.
Merrill Brothers, Maspeth, N. Y.
Mid-West Screw Products Co., St. Louis, Mo.
Milled Screw Products Co., Chicago, Ill.
Milton Manufacturing Co., The, Milton, Pa.
Mitchell Engineering Co., The, Springfield, Ohio.
Modern Tool Works, Rochester, N. Y.
Moore, Inc., George W., Boston, Mass.
Morrow Screw & Nut Co., Ltd., Ingersoll, Ontario, Canada.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Mueller Co., Decatur, Ill.
Murchey Machine & Tool Co., Detroit, Mich.
Napoleon Products Co., The, Napoleon, Ohio.
National Acme Co., The, Cleveland, Ohio.
National Brass Co., Grand Rapids, Mich.
National Lock Co., Rockford, Ill.
National Machine Products Co., Detroit, Mich.
National Screw & Manufacturing Co., The, Cleveland, Ohio.
New Britain Machine Co., The New Britain, Conn.
New York Air Brake Co., The, Watertown, N. Y.
New York Central System, New York, N. Y.
Nilson Machine Co., The A. H., Bridgeport, Conn.
North & Judd Manufacturing Co., New Britain, Conn.
Northwest Automatic Products Corporation, Minneapolis, Minn.
Northwest Bolt & Nut Co., Seattle, Wash.
Ohio Brass Co., The, Mansfield, Ohio.
Oliver Iron & Steel Corporation, Pittsburgh, Pa.
Osgood Engineering Co., Boston, Mass.
Ottemiller Co., The Wm. H., York, Pa.
Pacific Car & Foundry Co., Renton, Wash.
Packard Motor Car Co., Detroit, Mich.
Palnut Co., The, Irvington, N. J.
Parker Wire Goods Co., Worcester, Mass.

Pawtucket Manufacturing Co., Pawtucket, R. I.
Peck, Stow & Wilcox Co., Southington, Conn.
Peerless Manufacturing Corporation, Louisville, Ky.
Penn Screw & Machine Works, Philadelphia, Pa.
Perry Fay Co., Elyria, Ohio.
Pheoll Manufacturing Co., Chicago, Ill.
Philadelphia Hardware & Malleable Iron Works, Inc., Philadelphia, Pa.
Pioneer Engineering & Manufacturing Co., Detroit, Mich.
Pioneer Pump & Manufacturing Co., Detroit, Mich.
Pittsburgh Screw & Bolt Corporation, Pittsburgh, Pa.
Potter Tool & Machine Works, Inc., New York, N. Y.
Pratt Manufacturing Co., William E., Joliet, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pullman-Standard Car Manufacturing Co., Worcester, Mass.
Quadriga Manufacturing Co., The, Chicago, Ill.
Ramsdell Manufacturing Co., Cleveland, Ohio.
Rausch Nut & Manufacturing Co., The, Cleveland, Ohio.
Reading Hardware Corporation, Reading, Pa.
Reed Manufacturing Co., Erie, Pa.
Reed & Prince Manufacturing Co., Worcester, Mass.
Reed Small Tool Works, Worcester, Mass.
Republic Steel Corporation, Bolt & Nut Division of, Cleveland, Ohio.
Resistoflex Corporation, Belleville, N. J.
Reynolds Co., Hal W., Cleveland, Ohio.
Rhode Island Tool Co., Providence, R. I.
Rochester Machine Screw Co., Inc., Rochester, N. Y.
Rogers Tool Corporation, John M., Gloucester City, N. J.
Rolled Thread Die Co., Worcester, Mass.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell & Erwin Manufacturing Co., New Britain, Conn.
Sabin Machine Co., Cleveland, Ohio.
St. Louis Screw & Bolt Co., St. Louis, Mo.
Sargent & Greenleaf, Inc., Rochester, N. Y.
Scherr Co., Inc., George, New York, N. Y.
Schnorr & Co., C. H., Springdale, Pa.
Scovill Manufacturing Co., Waterbury, Conn.
Screw Machine Specialty Co., Pittsburgh, Pa.
Sears, Roebuck & Co., Chicago, Ill.
Seymour Brass Turning Co., Seymour, Conn.
Shakeproof, Inc., Chicago, Ill.
Sheffield Corporation, The, Dayton, Ohio.
Sherman-Klove Co., The, Chicago, Ill.
Simmons Machine Tool Corporation, Albany, N. Y.
Smalley-General Co., Bay City, Mich.
Smith Manufacturing Co., F. H., Chicago, Ill.
Snap-On Tools Corporation, Kenosha, Wis.
South Bend Lathe Works, South Bend, Ind.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Standard Nut & Bolt Co., Valley Falls, R. I.
Standard Shop Equipment Co., Philadelphia, Pa.
Stevens Inc., John B., New York, N. Y.
Stewart Warner Corporation, Stewart Die Casting Division, Chicago, Ill.
Strong, Carlisle & Hammond Co., Cleveland, Ohio.
Stulz-Sickles Co., Newark, N. J.
Superior Machine & Engineering Co., Detroit, Mich.
Superex Gage Co., Ferndale, Mich.
Taft-Peirce Manufacturing Co., The, Woonsocket, R. I.
Taylor Instrument Companies, Rochester, N. Y.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Teer, Wickwire & Co., Jackson, Mich.
Thompson Products, Inc., Cleveland, Ohio.
Threadwell Tap & Die Co., Greenfield, Mass.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Triplex Machine Tool Co., New York, N. Y.
Triplex Screw Co., Cleveland, Ohio.
Trundle Engineering Co., The, Cleveland, Ohio.
Twining Laboratories, The, Fresno, Calif.
Union Twist Drill Co., Butterfield Division, Derby Line, Vt.
Union Twist Drill Co., S. W. Card Manufacturing Division. Mansfield, Mass.
United Drill & Tool Corporation, Whitman & Barnes Division, Detroit, Mich.
Upson-Walton Co., The, Cleveland, Ohio.
V & O Press Co., Inc., The, Hudson, N. Y.
Van Keuren Co., The, Watertown, Mass.
Vard Inc., Pasadena, Calif.
Vega Aircraft Corporation, Burbank, Calif.
Virginia Polytechnic Institute, Blacksburg, Va.

Waltham Machine Works, Waltham, Mass.
Walworth Co., New York, N. Y.
Waterbury Button Co., Waterbury, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Weatherhead Co., The, Cleveland, Ohio.
Weiler, Edward W., New York, N. Y. (In Principle.)
Wells Tool Co., Greenfield, Mass.
Western Automatic Machine Screw Co., The, Elyria, Ohio.
Western Electric Co., Inc., New York, N. Y.
Western Machine Co., Milwaukee, Wis.
Western Union Telegraph Co., Inc., New York, N. Y.
Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.
Williams & Co., J. H., Buffalo, N. Y.
Winter Brothers Co., Wrentham, Mass.
Woodruff & Sons Co., The Walter W., Mt. Carmel, Conn.
Woodworkers Tool Works, Inc., Chicago, Ill.
Worthington Pump & Machinery Corporation, Harrison, N. J.
Wright Accurate Screw Machine Products, Albert, San Francisco, Calif.
Wright Machine Co., Worcester, Mass.

U. S. GOVERNMENT

Agriculture, U. S. Department of, Washington, D. C.
Panama Canal, The, Mechanical Division, Balboa, C. Z.
Treasury Department, Washington, D. C.
Veterans Administration, Washington, D. C.

INDEX

A

American National screw threads:
Coarse-thread series 9, 10, 14, 16, 18
8-pitch thread series 24, 25, 28
Extra-fine thread series 38, 39, 40
Fine thread series 12, 13, 20, 22
16-pitch thread series 25, 27, 34, 36
12-pitch thread series 24, 26, 30, 32
Acceptance of standard 57
Acceptors of standard 59
Acceptor's responsibility 58
Allowance (definition) 4
Angle of thread (definition) 3
Angle of thread (specifications) 8
Angle—half angle of thread (definition) 3
Angle—helix angle of thread (definition) 3
Area, mean area (definition) 4
Axis of screw (definition) 3

B

Base of thread (definition) 3
Basic size (definition) 5
Basic diameter:
Coarse-thread series 10
8-pitch-thread series 25
Extra-fine-thread series 39
Fine-thread series 13
16-pitch-thread series 27
12-pitch-thread series 26

C

Classes of fits. (*See* Fits.)
Clearance at major diameter (specifications) 8
Clearance at minor diameter (specifications) 8
Clearance, crest (definition) 6
Clearance, terms relating to 4
Coarse-thread series (screw threads):
Basic diameters and thread data 10
Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits 14, 16, 18
Tap-drill sizes. (*See* Tap drills.)
Committee, standing 53
Crest of thread (definition) 3
Crest clearance (definition) 6

D

Definitions:
Allowance 4
Angle of thread 3
Axis of a screw 3
Base of thread 3
Basic size 5
Crest clearance 6
Crest of thread 3
Depth of engagement 4
Depth of thread 4
External and internal threads 2
Finish 6
Fit 6
Half angle of thread 3
Helix angle of thread 3
Lead 2
Length of engagement 4
Limits 7
Major diameter 2
Minor diameter 2
Mean area 4
Neutral zone 7
Number of threads 4
Pitch 2
Pitch diameter 2
Pitch line 4

Page

Definitions:—Continued.
Root 3
Screw thread 2
Side or flank 3
Thickness of thread 4
Tolerance 5
Department of Commerce responsibility 58
Depth of engagement (definition) 4
Depth of thread (definition) 4
Depth of thread (specifications) 8
Diameter, major (definition) 2
Diameter, minor (definition) 2
Diameter, pitch (definition) 2
Diameters, basic (coarse-thread series) 10
Diameters, basic (fine-thread series) 13
Dimensions. (*See* Fits.)
Directions of tolerances on screw and nut (*see* fig. 10).
Drills. (*See* Tap drills.)

E

Eight-pitch screw-thread series:
Basic diameters and thread data 25
Limiting dimensions and tolerances, classes 2 and 3 fits 28
Tap-drill sizes 47
Enforcement 58
Engagement, depth of 4
Engagement, length of 4
Extra-fine screw-thread series:
Basic diameters and thread data 39
Limiting dimensions and tolerances, classes 2 and 3 fits 40
Tap-drill sizes 52, 53
External thread (definition) 2

F

Flank or side (definition) 3
Flat at crest and root (specifications) 8
Flank—side of flank (definition) 3
Fine thread series:
Recommendations 12
Basic diameters and thread data 13
Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits 20, 22
Tap-drill sizes 45, 46
Finish (definition) 6
Fit (definition) 6
Fits:
Coarse-thread series—classes 1, 2, 3, and 4 fits 14, 16, 18
8-pitch-thread series—classes 2 and 3 fits 28
Extra-fine-thread series—classes 2 and 3 fits 40
Fine-thread series—classes 1, 2, 3 and 4 fits 20, 22
16-pitch-thread series—classes 2 and 3 fits 34, 36
12-pitch-thread series—classes 2 and 3 fits 30, 32

H

Half angle of thread (definition) 3
Helix angle of thread (definition) 3
History of project 54

I

Identification symbols 7
Internal thread (definition) 2

L

Labeling 53
Lead (definition) 2
Length of engagement (definition) 4
Limiting dimensions and tolerances. (*See* Fits.)
Limits (definition) 7

M Page

Major diameter (definition) 2
Mean area (definition) 4
Minor diameter (definition) 2

N

Neutral zone (definition) 7
Nomenclature. (*See* Terms relating to classifications and tolerances.)
Notation. (*See* Definitions, Symbols.)
Number of threads (definition) 4
Numbering of tables 2

P

Pitch (definition) 2
Pitch diameter (definition) 2
Pitch line (definition) 4
Promulgation of Commercial Standard CS24–43 II
Purpose of Commercial Standard CS24–43 9

R

Responsibility of Acceptor 58
Responsibility of Department of Commerce 58
Root (definition) 3

S

Screw thread (definition) 2
Scope of Commercial Standard CS24–43 1
Side or flank (definition) 3
Sixteen-pitch screw-thread series:
  Basic diameters and thread data 27
  Limiting dimensions and tolerances, classes 2 and 3 fits 34, 36
  Tap-drill sizes 50, 51
Sizes of tap drills. (*See* Tap drills.)
Specifications:
  Angle of thread 8
  Flat at crest and root 8
  Depth of thread 8
  Clearance at minor diameter 8
  Clearance at major diameter 8
  Thread series 8
Standing committee 53
Standards, Commercial list of 66
Symbols (identification) 7

T

Tables:
  Coarse-thread series:
    Sizes No. 1 (0.073″) to 4″ 10, 11
    Classes 1, 2, 3, and 4 fits 14, 16, 18
  8-pitch-thread series
    Sizes 1″ to 6″ 25
    Classes 2 and 3 fits 28

Tables:—Continued. Page
  Extra-fine-thread series
    Sizes ¼″ to 2″ 39
    Classes 2 and 3 fits 40
  Fine-thread series
    Sizes No. 0 (0.060″) to 1½″ 13
    Classes 1, 2, 3, and 4 fits 20, 22
  16-pitch-thread series
    Sizes ¾″ to 4″ 27
    Classes 2 and 3 fits 34, 36
  12-pitch-thread series
    Sizes ½″ to 6″ 26
    Classes 2 and 3 fits 30, 32
  Tap drills for No. 1 to 3¾″ coarse-thread series 43, 44
  Tap drills for 1″ to 3½″ 8-pitch-thread series 47
  Tap drills for ¼″ to 2″ extra-fine-thread series 52, 53
  Tap drills for No. 0 to 1½″ fine-thread series 45, 46
  Tap drills for ¾″ to 3½″ 16-pitch-thread series 50, 51
  Tap drills for ½″ to 3½″ 12-pitch-thread series 48, 49
  Numbering of 2
  Scope of 1
Tap-drill sizes:
  Coarse-thread series 43, 44
  8-pitch-thread series 47
  Extra-fine-thread series 52, 53
  Fine-thread series 45, 46
  16-pitch-thread series 50, 51
  12-pitch-thread series 48, 49
  Specifications 42
Terms relating to classification and tolerances 4, 5, 6, 7
Thickness of thread (definition) 4
Thread, thickness of (definition) 4
Thread data:
  Coarse-thread series 10
  Definitions. (*See* Definitions.)
  8-pitch-thread series 25
  Extra-fine-thread series 39
  Fine-thread series 13
  16-pitch-thread series 27
  12-pitch-thread series 26
  Specifications. (*See* Specifications.)
Thread series (specifications) 8
Tolerance (definition) 5
Tolerances, terms relating to 4, 5, 6, 7
Tolerances. (*See* Fits.)
Twelve-pitch screw-thread series:
  Basic diameters and thread data 26
  Limiting dimensions and tolerances, classes 2 and 3 fits 30, 32
  Tap-drill sizes 48, 49

U

Uniform-pitch screw-thread series:
  8-, 12-, 16-pitch-thread series 24, 25

CS No. Item

0–40. Commercial standards and their value to business (third edition).
1–42. Clinical thermometers (third edition).
2–30. Mopsticks.
3–40. Stoddard solvent (third edition).
4–29. Staple porcelain (all-clay) plumbing fixtures.
5–40. Pipe nipples; brass, copper, steel, and wrought iron.
6–31. Wrought-iron pipe nipples (second edition). Superseded by CS5–40.
7–29. Standard weight malleable iron or steel screwed unions.
8–41. Gage blanks (third edition).
9–33. Builders' template hardware (second edition).
10–29. Brass pipe nipples. Superseded by CS5–40.
11–41. Moisture regains of cotton yarns (second edition).
12–40. Fuel oils (fifth edition).
13–42. Dress patterns (third edition).
14–39. Boys' button-on waists, shirts, junior and polo shirts (made from woven fabrics) (second edition).
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17–42. Diamond core drill fittings (third edition).
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19–32. Foundry patterns of wood (second edition).
20–42. Staple vitreous china plumbing fixtures (third edition).
21–39. Interchangeable ground-glass joints, stopcocks, and stoppers (fourth edition).
22–40. Builders' hardware (nontemplate) (second edition).
23–30. Feldspar.
24–43. Screw threads and tap-drill sizes.
25–30. Special screw threads. Superseded by CS24–43.
26–30. Aromatic red cedar closet lining.
27–36. Mirrors (second edition).
28–32. Cotton fabric tents, tarpaulins, and covers.
29–31. Staple seats for water-closet bowls.
30–31. Colors for sanitary ware.
31–38. Wood shingles (fourth edition).
32–31. Cotton cloth for rubber and pyroxylin coating.
33–32. Knit underwear (exclusive of rayon).
34–31. Bag, case, and strap leather.
35–42. Plywood (hardwood and eastern red cedar) (second edition).
36–33. Fourdrinier wire cloth (second edition).
37–31. Steel bone plates and screws.
38–32. Hospital rubber sheeting.
39–37. Wool and part wool blankets (second edition) (Withdrawn as commercial standard, July 14, 1941).
40–32. Surgeons' rubber gloves.
41–32. Surgeons' latex gloves.
42–35. Fiber insulating board (second edition).
43–32. Grading of sulphonated oils.
44–32. Apple wraps.
45–42. Douglas fir plywood (fifth edition).
46–40. Hosiery lengths and sizes (third edition).
47–34. Marking of gold-filled and rolled-gold-plate articles other than watchcases.
48–40. Domestic burners for Pennsylvania anthracite (underfeed type) (second edition).
49–34. Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
50–34. Binders board for bookbinding and other purposes.
51–35. Marking articles made of silver in combination with gold.
52–35. Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
53–35. Colors and finishes for cast stone.
54–35. Mattresses for hospitals.
55–35. Mattresses for institutions.
56–41. Oak flooring (second edition).
57–40. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).

CS No. Item

58–36. Woven elastic fabrics for use in overalls (overall elastic webbing).
59–41. Woven textile fabrics—testing and reporting (third edition).
60–36. Hardwood dimension lumber.
61–37. Wood-slat venetian blinds.
62–38. Colors for kitchen accessories.
63–38. Colors for bathroom accessories.
64–37. Walnut veneers.
65–43. Methods of analysis and of reporting fiber composition of textile products (second edition).
66–38. Marking of articles made wholly or in part of platinum.
67–38. Marking articles made of karat gold.
68–38. Liquid hypochlorite disinfectant, deodorant, and germicide.
69–38. Pine oil disinfectant.
70–41. Phenolic disinfectant (emulsifying type) (second edition) (published with CS71–41).
71–41. Phenolic disinfectant (soluble type) (second edition) (published with CS70–41).
72–38. Household insecticide (liquid spray type).
73–38. Old growth Douglas fir standard stock doors.
74–39. Solid hardwood wall paneling.
75–42. Automatic mechanical draft oil burners designed for domestic installations (second edition).
76–39. Hardwood interior trim and molding.
77–40. Sanitary cast-iron enameled ware.
78–40. Ground-and-polished lenses for sun glasses (second edition) (published with CS79–40).
79–40. Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78–40).
80–41. Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
81–41. Adverse-weather lamps for vehicles (after market).
82–41. Inner-controlled spotlamps for vehicles (after market).
83–41. Clearance, marker, and identification lamps for vehicles (after market).
84–41. Electric tail lamps for vehicles (after market).
85–41. Electric license-plate lamps for vehicles (after market).
86–41. Electric stop lamps for vehicles (after market).
87–41. Red electric warning lanterns.
88–41. Liquid-burning flares.
89–40. Hardwood stair treads and risers.
90– . (Reserved for power shovels and cranes).
91–41. Factory-fitted Douglas fir entrance doors.
92–41. Cedar, cypress, and redwood tank stock lumber.
93–41. Portable electric drills (exclusive of high frequency).
94–41. Calking lead.
95–41. Lead pipe.
96–41. Lead traps and bends.
97–42. Electric supplementary driving and passing lamps for vehicles (after market).
98–42. Artists' oil paints.
99–42. Gas floor furnaces—gravity circulating type.
100–42. Multiple-coated, porcelain-enameled steel utensils.
101–43. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
102– . (Reserved for Diesel and fuel-oil engines).
103–42. Cotton and rayon velour (jacquard and plain).
(E) 104–43. Warm air furnaces equipped with vaporizing pot-type oil burners.
105–43. Mineral wool; loose, granulated, or felted form, in low-temperature installations.
(E) 106–43. Boys' pajamas (made from woven fabrics).

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington D. C.